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AN INTRODUCTION
TO
ANTHROPOLOGY

AN INTRODUCTION TO ANTHROPOLOGY

By

Rakhal Krishna Mondal, M.Sc., M.B., D.P.H., D.T.M.

AND

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To
THE SACRED MEMORY
OF
Sir Asutosh Mookerjee

FOREWORD

ENQUIRY into the unrecorded history of early humanity and a study of race distinctions have of late engaged the attention of all the civilised people of the world, and Anthropology is now an important branch of study. Its vast possibilities and the prospect of social improvement and reorganisation through the propagation of its knowledge have led the great minds of the world to lay a special stress on it. The late Sir Asutosh saw its importance and took the initiative to introduce it as a subject of study in the curriculum of the degree examinations of the University of Calcutta. His worthy son, S. J. Shyama Prasad Mookerjee's Vice-Chancellorship takes the glory of its opening up to the Intermediate students. And here we offer a handy compendium to our young learners.

As it had to be brought hurriedly through the press, some mistakes might have crept into it, and we hope to be excused for the defects by our kind readers.

Our sincerest thanks are due to Mr. Gopinath De of the Indian Art School for the troubles he has so kindly taken in preparing the designs for the blocks, and without whose help timely publication would not have been possible.

CALCUTTA
30th June, 1936

R. K. M.
M. N. B.

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AN INTRODUCTION TO ANTHROPOLOGY

PART I PHYSICAL ANTHROPOLOGY

CHAPTER I

ANTHROPOLOGY: ITS MEANING AND USEFULNESS

ANTHROPOLOGY is derived from two Greek terms, 'ANTHROPOS' meaning man, and 'LOGOS,' science. Hence it means the science of man.

Broca has defined Anthropology as "a science which has for its objects a study of the human race considered as a whole in its separate individuality and its relation to the races of the world." According to Bertillon "Anthropology is a science pure in concrete, having for its aim, the thorough knowledge of human group considered in its relation with the races of the world."

It was Aristotle who first coined the word "ANTHROPOLOGY." In the sixteenth century Anthropology meant human Physiology and Anatomy. In the same century Vesalius began a serious study by dissecting human body. In the seventeenth century Tyson began to study Comparative Anatomy by cranial measurements. The eighteenth century afforded several notable names in the history of PHYSICAL ANTHROPOLOGY. The chief contributors were Linneaus, Blumendeck and Camper. Then in the nineteenth century we meet with Darwin and Huxley. Marett has remarked, "ANTHROPOLOGY is the child of DARWIN."

The twentieth century sees the rapid march of Anthropology in its diverse fields, and the most notable names are Haddon, Arthur Keith, Elliot Smith, Deniker, Ruggeri, Wissler and Boule.

ANTHROPOLOGY includes the following subjects:—

1. COMPARATIVE ANATOMY, EMBRYOLOGY and PATHOLOGY, to study the variation both of outward appearance and inward structure.
2. Methods of BIOMETRY and MENDELIAN researches.
3. GEOGRAPHY for the study of distribution of races and the influence of environment on mankind.
4. PALAEONTOLOGY or the study of fossils.
5. Existing races of mankind both savage and civilised.

6. SOCIOLOGY.
7. POLITICS.
8. RELIGION.
9. LANGUAGE.
10. ARCHAEOLOGY, the study of pre-historic remains.

Thus we see that ANTHROPOLOGY is a very comprehensive subject. The earlier Anthropologists restricted the science to evolution only. Broca calls the study of man as an animal including the comparative study of structural difference between members of different races of mankind, the biology of human species. But English Anthropologists would prefer the name PHYSICAL ANTHROPOLOGY or SOMATOLOGY for this branch of general Anthropology. The other branch is ETHNOLOGY, 'ETHNOS' meaning race, 'LOGOS,' science, i.e., the science of race. PHYSICAL ANTHROPOLOGY studies man as a unit in the animal kingdom; while ETHNOLOGY studies man's development through the family and tribal stages into racial and national life. ETHNOGRAPHY is a subdivision of ETHNOLOGY. It deals with the description of a special people or group of people taken independently.

The following classification proposed by the board of studies in ANTHROPOLOGY in the University of London may serve as a guide for the study of ANTHROPOLOGY:—

A. PHYSICAL ANTHROPOLOGY:—

(a) Zoological, including Craniology and Somatology: Man's place in the animal kingdom

from a study of Comparative Anatomy, and Physiology.

(b) Palaeontological: the antiquity of 'man from fossil or semi-fossilised remains.'

(c) Physiological and Psychological: 'The comparative study of the bodily functions and mental processes.

(d) Ethnological: classification of the human race according to physical characters and geographical distributions.

' B. CULTURAL ANTHROPOLOGY :—

(a) Archaeological: 'The antiquity of man evidenced by the earliest remains of man's handwork.

(b) Technological: 'The comparative study of arts and industries, their origin, development and distribution.

(c) Sociological: 'The comparative study of social phenomenon and organisation, birth, education, marriage, death, manners and customs, social and religious associations, government and laws, moral ideas and codes, magical and religious ideas and practices.

(d) Linguistic: 'The comparative study of languages and classification of people, based upon cultural conditions and characteristics, and the influence of environment upon culture.

THE VALUE AND USEFULNESS OF
ANTHROPOLOGY

ANTHROPOLOGY is now a science, a systematic study of the human races from their origin. Like the other branches of science it will help the student to learn exactitude in the method of observation, recording and generalisation, as well as give him an effective mental training. Here we study, observe and interpret with an unbiased mind, the physical and mental traits of ourselves and of our neighbours. This particular aspect of Anthropology makes its study essential to every man, as our struggle in life is not only with inanimate material objects, but also with our own prejudices and the cultural diversities of our neighbours. Particularly in India, where the cultural differences are so striking that we come across with peoples having every stage of culture from the most primitive to the most civilised modern, its study is essential for our everyday life to deal with people of diverse culture and mentality. It is no doubt a good sign that Anthropology is now a compulsory subject for the African civil service, and has also been included in the curriculum for the Indian civil services. It is important not only to administrators but also to merchants trading in these countries. Moreover, while all over the world people are making vigorous efforts to improve the intellectual, moral and material conditions of mankind, the questions of race, inheritance, physical capacity, environmental aspects and cultural diversities, can in no way be ignored. The

study of Anthropology is to-day absolutely essential to the eugenists, administrators, statesmen and reformers, who devote their lives for the progress and betterment of the human race. Lastly, the study of man will surely enable us to guide and direct the human race towards producing superior races, with far greater capacity to win in the struggles and far better fitted for the changing conditions of life. And Pope has justly said

•“The proper study of mankind is man.”

CHAPTER II

MAN'S PLACE IN THE ANIMAL KINGDOM

Linneaus, the great systematiser of Zoology, in the 18th century, first of all definitely ascertained the place of man as a species in the order of PRIMATES. Since, then quite new fossil remains have enabled us to take a peep into the probable course of evolution from the most primitive type of primates into man. A detailed study would show us that the TERSIUS like creatures developed into flat nosed monkeys, old world monkeys, anthropoid apes (Gibbon, Orang-uttan, Chimpanzee and Gorilla), and man successively. Prior to that we had proofs of the origin of the mammals from some primitive ancestors in Mesozoic or Secondary times. The earlier students of evolution like Haeckel, elaborated the doctrine that ontogeny repeats phylogeny (the history of individuals repeating the history of the race), and from embryology

tried to arrive at a series of hypothetical stages of the ancestral man from unicellular creatures.

According to Haeckel the first stage was like that of an unicellular *protozoa* (e.g. *amoeba*), the second, of a colony of close homogeneous cells like the round cell communities of *volvox*, etc. The third, had a body only with a primitive cut and with the wall made up of two layers like that of the *hydra*. In the fourth stage there is a bi-lateral symmetrical body, and in the fifth and the sixth, the different layers begin to develop. In the seventh, there is only a series of segments for the body with nose, skull, jaws and limbs. In the eighth stage, the rudimentary brain is formed and nose, eyes and ears appear. In the ninth, we have the fish like creatures developing into *amphibia*, or frog like creatures which develop into *proto-reptiles*, which again develop into *Reptilo-mammals*.

MAMMALS (breast fed vertebrates)

Mammals are warm blooded vertebrates. They are air breathing and they have an epidermal covering in the form of hair.

The following are the distinctive characters of mammals:—

SKELETAL.

1. There are two condyles in the foramen magnum of the skull.

2. The lower jaw articulates directly with the skull, i.e., without quadrate bone.

3. Teeth are diphyodont (two sets of teeth), thecodont (embedded in sockets) and heterodont (not alike).

4. Long bones have a central shaft and a distal epiphyses.

5. In the pectoral arch the coracoid is vestigial and the scapula articulates with the sternum by means of a clavicle, and the pre-coracoid is absent.

6. In the vertebral column there is an intervertebral disc.

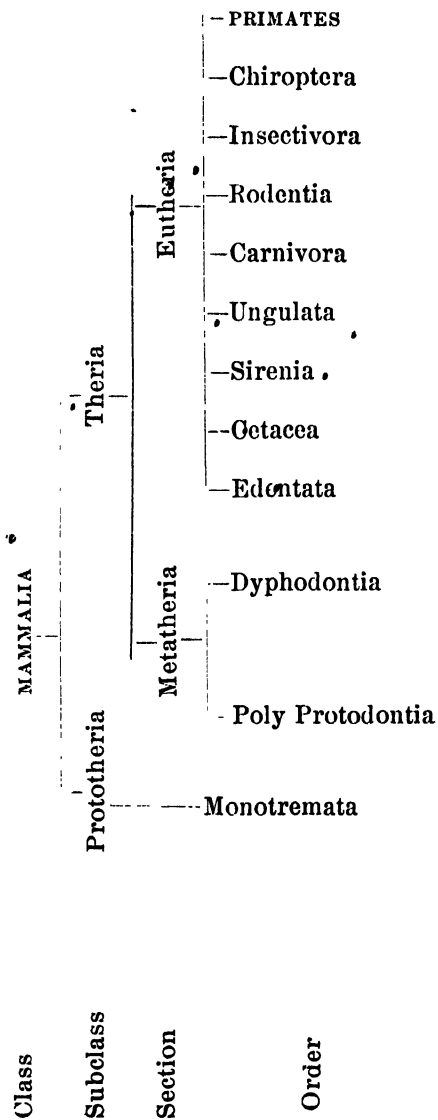
7. The epiglottis is noticed.

FUNCTIONAL

1. Mammals are warm blooded animals.
2. They have skin covering in the form of hair.
3. They are viviparous.
4. They are placental.
5. They nourish the young on milk.

SOFT STRUCTURE

1. A cloaca is absent.
2. A diaphragm divides the body cavity into an anterior thorax and a posterior abdomen.
3. The heart is completely divided into two halves, each containing an auricle and a ventricle.
4. There is a corpus callosum uniting the two halves of the larger brain (cerebrum).
5. The pons varolii unites the two halves of the smaller brain (cerebellum).
6. The Ureter opens into the bladder.
7. Red blood corpuscles (R. B. C.) are non-nucleated and circular.



The subclass, *prototheria*, includes a single living order, the *Monotremata*, which includes the Duck-Bill or *platypus* and spiny ant-eater. The examples of *theria* are *marsupials*, e.g. Kangaroos.

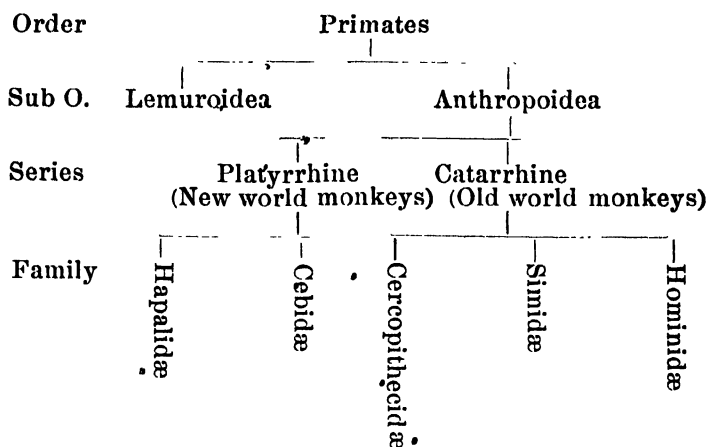
The order *Polyprotodortia* includes the *opposum* (*Didelphyidae*) and the next one is *Dasyurus*. The *Dyphodontia* includes the wambats.

The examples of *Edentata* are sloth; *Cetate*—whales; *Sirenia*—Dugong; *Ungulata*—Hervivorous Euthleria; *Carnivora*—cats & dogs; *Rodentia*—rats, porcupines; *Insectivora*—moles, *Talpidae*; *Chiroptera*—flying foxes.

The term *Primates* was first given by Linneaus. It includes certain animals of somewhat different in appearance, but may be distinguished from all other mammals by combination of the following specialised characters:—

1. It leads an arboreal life with prehensile limbs.
2. The pollex and hallux are more or less completely opposable.
3. There are usually five digits with flat nails in both manus and pes (hands and feet).
4. The orbit is surrounded by a complete bony rim.
5. The clavicles are well developed.
6. The femur has never a third trochanter.
7. The stomach is simple.
8. The testes descend into the scrotum.
9. There are two mammary glands with teats.
10. Teeth are adapted for mixed diet.

Classification of the Primates



LEMUROIDEA: most ancient of living primates, found in Africa, Madagascar, Java, Sumatra, Borneo, Malay Peninsula and East Indies. It leads an arboreal life. The digits of both feet are provided with flat nails except the 2nd one of the hind foot, which has a claw. The face is hairy. The occipital foramen is placed posteriorly. The orbits are widely separated. There is a diastema between the inner incisors. The cerebral hemisphere is not highly developed and do not completely cover the cerebellum. This suborder comprises the *Lemurs*, *Tersii* and *Chiromis*. It has got three other names: prosimians, pseudo-monkeys, fox-faced-monkeys.

ANTHROPOIDEA: highly organised primates with 32-36 teeth. The digits are all provided with flat nails (except in *Hapalidae*). No diastema is noticed

between the inner incisors, they are in close contact. The cerebral hemisphere is generally convoluted and completely covers the cerebellum. This suborder is divided into two series (vide chart above) in early *Eocene* times.

PLATYRRHINE: it is so called on account of the wide nostrils. It leads an arborial life. The skull is round and varies in size. One peculiar thing is to be noticed in the teeth. The dental formula is: $i \frac{2}{2}, c \frac{1}{1}, pm \frac{3}{3}, m \frac{2}{2}$ or $\frac{3}{3}$, i. e., 36 altogether. Whereas in catarrhine group we meet with 32. This series is divided into 2 families:—

I. HAPALIDÆ: Anthropoids, who have got pollex not opposable, and whose all the digits (except hallux) are provided with curved pointed claws. The nasal septum is broad. There is no cheek pouch. Ischial callosities are noticed. The tail is not prehensile. The dental formula is: $i \frac{2}{2}, c \frac{1}{1}, pm \frac{3}{3}, m \frac{2}{2}$. This family includes the Marmosets.

II. CEBIDÆ: Anthropoids, these also have got pollex not opposable. All digits are provided with flat nails. The nasal septum is broad. Cheek pouch and ischial callosities are not found. The dental formula is: $i \frac{2}{2}, c \frac{1}{1}, pm \frac{3}{3}, m \frac{3}{3}$. It includes the spider monkeys.

CATARRHINE: It leads an arborial as well as a terrestrial life. It is small in appearance with a non-prehensile tail. The head is round and the face varies in size.

The Old World monkeys differ from the New World monkeys in the following characters:—

A. External characters:—

1. The nasal septum is narrow and the nostrils project forwards.

2. All digits have nails which are more flattened in the New World monkeys.

3. Thumb and great toe are capable of more independent and individual movements.

4. All species have got ischial callosities.

B. Internal characters:—

1. In the skull the backward extension of the zygoma has never been possible for the articulation with the parietals.

2. A triangular piece of the frontal bone is never wedged in between the two parietal bones.

3. Extension of the premaxilla up to the nasal opening is seen.

4. There is no bulla.

5. The external auditory meatus is present.

6. The palate of the upper jaw is long.

7. The basi-cranial axis is found to be short.

8. There are two premolars (Pm.)

9. The upper premolar has got 3 roots, while the lower has only 2.

The Catarrhine group comprises three families:—

I. CERCOPITHECIDÆ: Anthropoids in which the following characters are present: The nasal septum is narrow. Cheek pouch and ischial callosities are present. The pollex are opposable. The dental

formula is: $i^2/2$, $c^1/1$, $pm^2/2$, $m^3/3$. This family includes monkeys, baboons, macacus, etc.

II. SIMIDAE: Anthropoid apes in which the upper extremity is always larger than the lower extremity. Absence of cheek pouch and ischial callosities are noticed. No tail is found. The nasal septum is narrow. The dental formula is: $i^2/2$, $c^1/1$, $pm^2/2$, $m^3/3$. It includes the Gibbon (HYLOBATES), Orang-utan, Chimpanzee (ANTHROPO-PITHECUS) and the Gorilla.

GIBBON (HYLOBATES MULLERI): The skull is small, broad and oval. The gibbon's height is 3 ft. The arms are longer in proportion to the length of its body. The fore arm is longer than the arm. The tail is absent. In comparison with the facial region the brain case is larger. No crest is found on the cranium. The orbital cavities are large. The nasal aperture has an ovoid form. The nasal spine is not found. The dental formula is: $i^2/2$, $c^1/1$, $pm^2/2$, $m^3/3$. The molar tooth has 3 cusps. The canine is large. The ramus of the mandible is found to be short and the genial tubercles are absent, as will be noticed in the Chimpanzee.

A Comparative study of the Gibbon and the Macacus:

GIBBON	MACACUS
1. Lower jaw—	Ramus, rectangular.
Ramus, square.	

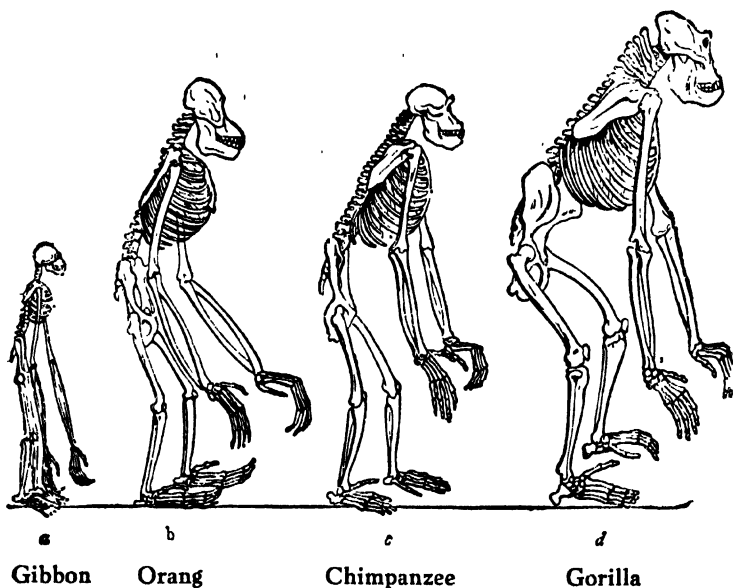
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|--|---|
| 2. Canines not very prominent | Canines very prominent. |
| 3. Cusps of the teeth are flattened. | Cusps are sharp. |
| 4. Supraorbital ridges separate. | Supraorbital torus. |
| 5. Temporal ridges not prominent | Temporal ridges prominent and high up. |
| 6. Height of the skull is proportionately greater. | Height of the skull is proportionately smaller. |
| 7. Head is broad & oval | Head is long and oval. |

The Gibbon is regarded as the most primitive of the living Anthropoid apes. It can walk erect and can make free use of the arms and independent movement of the fingers, which we see only among the *Hominidae* group (man), and in no other *Simiidae*.

ORANG-UTAN: The Orang differs much from the Gibbon in its heavy built. Its height is about 4 ft. The skull is bulkier than that of the Gibbon. The orbits are found to be elliptical in shape. The supra-orbital ridges are not continuous. The contour of the nasal aperture is pyriform and there is no nasal spine. The dental formula is: $i^{2/2}, c^{1/1}, pm^{2/2}, m^{3/3}$. In front of each of the upper canine teeth there is a large diastema. The lower jaw is very massive in comparison with the skull. The body of the Orang is built in such a fashion that it can specialise for arboreal

life to a lesser degree than the Gibbon, but to a higher degree than the Chimpanzee and the Gorilla.

CHIMPANZEE: It is not so strongly built as the Orang and the Gorilla, but more than the Gibbon. The Chimpanzee (male) has a height of 5 ft., but the female is not so high. When it walks its arms reach below the level of the knee-joints. But among the



higher races of mankind of the world we find that they reach the mid portions of the thigh. Whenever we cast a glance from above the skull, it looks ovoid. The facial region is found to be smaller in proportion to the skull. The bony crests are seen on the skull, but they are less so when compared with that of the

Gorilla. The contour of the orbit is elliptical, but not so as we find among the Orang. The supraorbital ridges are continuous. The nasal aperture is pyriform and no nasal spine is noticed. The dental formula is: $i^2/2, c^1/1, pm^2/2, m^3/3$. In the teeth the diastema is found to be less wide than that of the other *Simiidae*. The lower jaw (mandible) is small. The protrusion of the teeth rows and receding of the chin process, suggest those in the *Pittdown* and the *Neanderthal* races.

GORILLA: The Gorilla is the largest and the strongest of the primates. The animal attains a height of 6 ft. When it stands erect the hands go below the knee joints. The proportion of the arms and fore arms is found to be more alike that of the *Hominidae* (man) than that of other anthropoid apes. Thus the arms are longer than the fore arms. Hence it differs from the Gibbon, the Orang and the Chimpanzee. Like man and Orang the hands are shorter than the legs. But in the case of the Gibbon and Chimpanzee we notice that the hands are longer than the legs. The skull is oval in shape. The facial portion is proportionately larger than the cranial part. The supraorbital ridges are very prominent and continuous. The nasal bones are large, wide and flat. There is no nasal spine as is found among the *Hominidae* (man). The upper jaw is prognathous and the lower jaw is strongly built. The dental formula is: $i^2/2, c^1/1, pm^2/2, m^3/3$. The canines are large and a diastema is noticed after each.

By anthropoid apes we mean Gibbon, Orang,

Chimpanzee and Gorilla; but by higher apes we understand Orang, Chimpanzee and Gorilla. The Gibbon is included in the lower apes.

DISTINCTIVE CHARACTERISTICS OF THE SKULLS OF SIMIDAE

GIBBON: The skull is very small in comparison with the skulls of the *simidae*. The nasal bone is also small. The cusps of the molar teeth possess oblique ridges like those of the *Hominidae* (Man).

ORANG: The supraorbital ridge is not continuous, but it is distinct in appearance when each orbit is taken into account. The nasal bone seems to be splint-like in appearance. The crowns of the molar teeth have crenate markings and cusps are found to be obscured. The mandible (lower jaw) is large when compared with the skull.

CHIMPANZEE: In this case also we meet with the continuity of the supraorbital ridges. The nasal bone is not splint-like in appearance, but short and flat. Crowns of the molar teeth have distinct and medium sized cusps.

GORILLA: The skull is large. The facial region is comparatively larger. The cranial ridges are marked. The nasal bone is large and the nasal aperture is ovate. The molar teeth have very large cusps.

III. HOMINIDAE: Man (skeletal studies have been discussed in connection with "elementary knowledge of the human skeleton").

Man has attained the supreme position in the

animal kingdom. This has been due to the following:

1. Erect posture.
2. Complexity of brain (convoluted).
3. Power of articulate speech.
4. Bi-manus and Bi-pedae.

COMPARATIVE STUDY OF THE CRANIAL CHARACTERS OF HOMINIDÆ AND SIMIDÆ

The characters which differentiate man from apes:

1. The chin is prominent.
2. The ascending mandibular ramus is high and there is a coronoid process with a deep sigmoid notch behind it.
3. The dimensions of the maxilla are diminished.
4. Early and complete fusion of the pre-maxilla and the maxilla is noticed.
5. The positions of the foramen magnum and the occipital condyles are in forward direction.
6. The basal part of the cranium is inflected.
7. The bony ridges are lacking.
8. The nasal bone is large.
9. The sphenomaxillary fissure is wide.
10. The parietal and the sphenoid bones are articulated at a point known as *pterion*.
11. In the orbit the lachrymal and the ethmoid bones are articulated.
12. The size of the teeth is uniform.

N. B.—The last 6 (six) characters are more primitive than that of the simidæ.

CHAPTER III

AN ELEMENTARY KNOWLEDGE OF THE HUMAN SKELETON

The obvious division of the *human skeleton* is into skull, trunk and extremities.

THE BONES OF THE SKULL

THE SKULL is the large bony case at the anterior or upper extremity of the vertebral column. It consists of a cranium and the face.

THE CRANIUM is a large and hollow bony case which encloses the brain. The cranium is usually said to consist of eight bones:

1 *Occipital*—forms the back and a part of the base of the skull; has a large opening, *foramen magnum*. On each side of the front portion of this cavity is situated a rounded projecting mass of bone called the *condyle*.

2 *Parietal*—quadrilateral in shape, form the side walls and roof of the cranium.

1 *Frontal*—the forehead bone, forms the front of the cranium.

2 *Temporal*—bones of the temples.

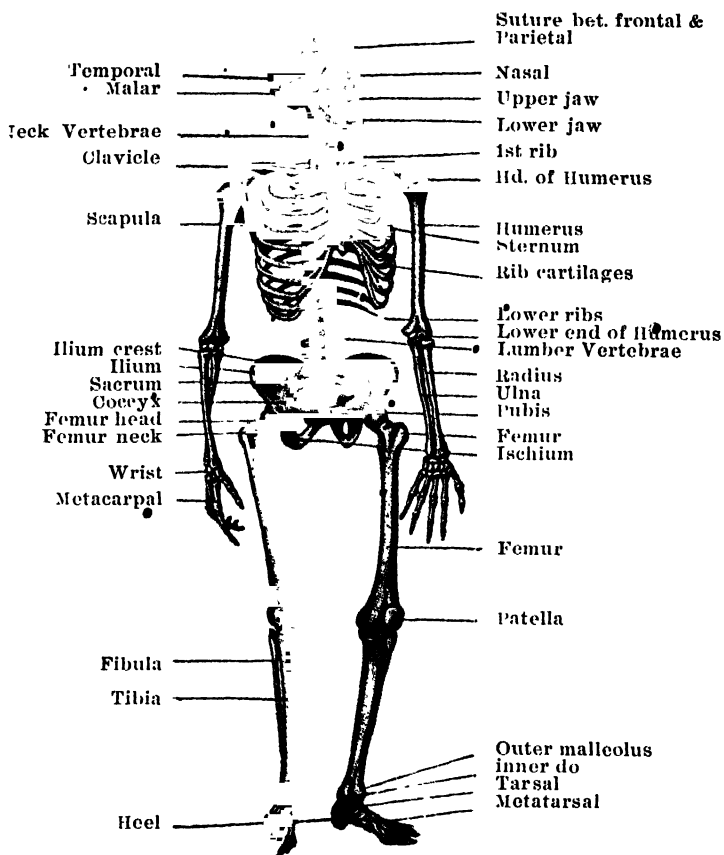
1 *Sphenoid*—irregular bat-shaped.

1 *Ethmoid*—between orbits and nasal roof, irregular in shape and perforated by a large number of small openings.

THE FACE forms the front and lower portion of the skull and consists of fourteen bones:

2 *Superior maxillary*—form upper jaw and the greater portion of the palate (roof of the mouth). In

HUMAN SKELETON



them are fixed the upper set of teeth.

2 *Palatal*—form back part of the palate.

2 *Nasal*—form the upper and hard bridge of the nose.

2 *Lachrymal*—on nasal side of the orbits—form the nasal ducts and sacs.

2 *Turbinated*—scroll-shaped bones of nose.

1 *Vomer*--separates nasal cavities; forms the hinder and lower part of the nasal septum.

FRONT VIEW OF THE SKULL,



1, frontal; 2, parietal; 3, temporal; 4, sphenoid; 5, nasal;
6, superior maxillary; 7, inferior maxillary; 8, malar.

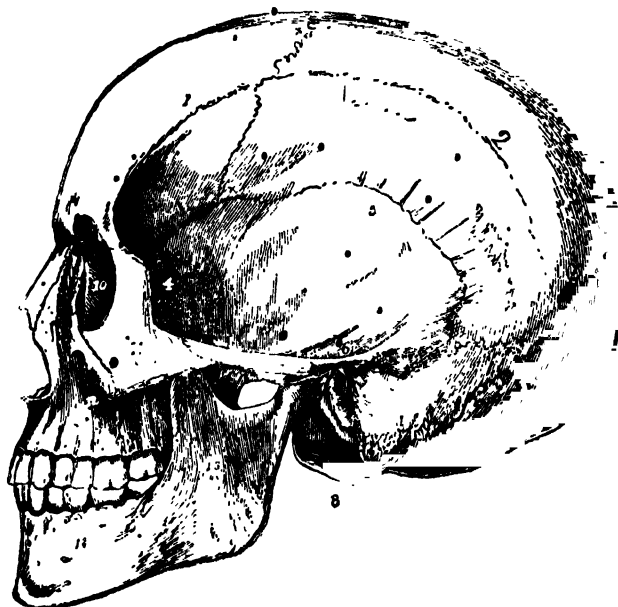
2 *Malar*—two prominent bones of the cheeks.

1 *Inferior maxillary*—the lower jaw; the largest and the only movable bone in the face, contains the lower set of teeth.

THE BONES OF THE TRUNK

THE TRUNK consists of the vertebral column and the ribs together with the *sternum*.

SIDE VIEW OF THE SKULL

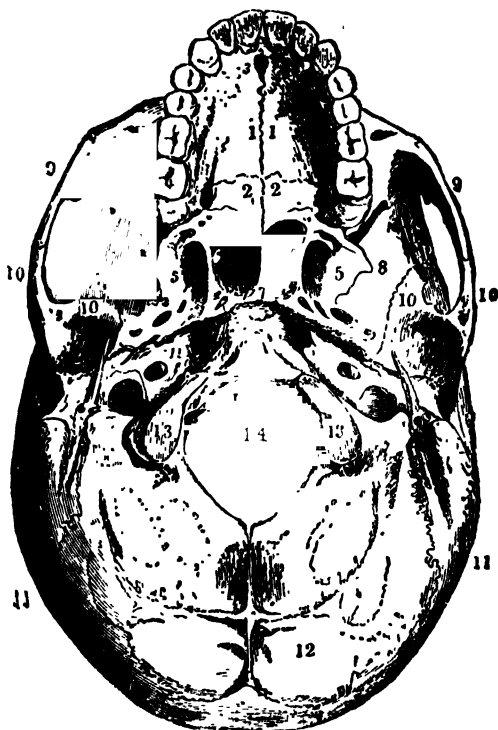


1, Frontal ; 2 parietal ; 3 and 8, occipital ; 4, wing of sphenoid ; 5, 6 & 7 temporal ; 10, lacrimal ; 11, malar ; 12, superior maxillary ; 13, ramus ; 14, inferior maxillary.

THE VERTEBRAL COLUMN is composed of a series of bones called the *vertebrae* and forms the axis with which all the other parts of the skeleton are connected. The base of the skull rest on the uppermost of these vertebrae and the lower portion of the column is

wedged in between the bones of the hip. The backbone is usually composed of thirty three bones origin-

BASE VIEW OF THE SKULL.



- 1, Superior maxillary ; 2, palatal ; 3, palatine foramen ;
 4, lesser palatine foramina ; 5 & 8, sphenoid ; 6, back
 opening of the nostril ; 7, vomer ; 9, malar ; 10, temporal ;
 11, parietal ; 12, occipital ; 13, condyles of occipital ;
 14, foramen magnum.

ally, but only twenty four of these are movable on each other (i.e. the bones of the neck, back, and loins).

The upper twenty four movable vertebrae are called the *true vertebrae*, while the lower nine bones are fused together and known as *false* or *fixed vertebrae*. The seven highest vertebrae belong to the neck and are called the *cervical vertebrae*. The next twelve are called the *dorsal* or *thoracic vertebrae* and support the ribs. The remaining five movable vertebrae belong to the loins and are called the *lumber vertebrae*. The lowest lumber vertebrae rest on the broad upper surface of a curved wedge, formed by the next five vertebrae fused together into one mass of bone (which has to bear the weight of the whole body lying above it) called the *Sacrum* and to its lowest and narrowest end is attached the *Coccyx* consisting of four imperfectly formed vertebrae (corresponding morphologically with the tail in other animals).

7 *Cervical*—neckbones; small bodies with vertebral canals. Spinous process short and bifid; lateral processes small.

12 *Thoracic*—backbones—larger bodies, heart shaped. Spinous process long, lateral processes thick. Two articular facets for attachment to ribs.

5 *Lumber*—loin bones—bodies large and massive; spinous process thick and broad; lateral processes long and slender.

1 (*fused*) *Sacrum*—united, forming a wedge fixed between hip-bones.

1 (*fused*) *Coccyx*—rudimentary and morphological with tail.

THE RIBS together with *the Sternum*. *The Ribs*—twelve on each side, are curved bones connected in pairs with the dorsal vertebrae behind, and, except the last two pairs, with the Sternum in front.

14 *True Ribs*—connected by their own cartilages with the Sternum.

10 *False Ribs*—8th, 9th and 10th pairs, each connected with the cartilage above it. 11th and 12th pairs are free (floating ribs), and fixed at vertebral end only; they are very short.

1 *Sternum*—breast bone—a long flat bone, the lower part of which is formed of flexible cartilage.

THE BONES OF THE EXTREMITIES

Upper Extremities (64 bones) consist of shoulder (pectoral girdle), the upper arm, the fore arm, the wrist, and the hand.

4 *Pectoral Girdle*—each consists of *Clavicle* and *Scapula*.

Clavicle or *Collar-bone*—articulates with the top part of the Sternum and Acromion.

Scapula or *Shoulder-blade*—triangular in shape, a prominent ridge at the back—*Spine*. The glenoid cavity at the upper and outer part of the scapula articulates with humerus; two processes *Acromion* and *Coracoid*.

2 *Upper arm*—*Humerus*—strong and long, consists of a long portion called shaft, two enlarged extremities, upper one—head, articulates with glenoid cavity of the Scapula, and the lower end, with *Radius* and *Ulna*.

4 *Forearm*—each group consists of *Ulna* and *Radius*.

Ulna—on the inner side of the forearm, its upper extremity is thick, and forms a hinge joint which articulates with the lower end of the humerus. It sends out a projection called *Olecranon process*. Its lower end articulates with the *Radius*.

Radius—slender at the top having a shallow cup-like end which articulates with the *humerus* and the *ulna*. Large lower end articulates with the *scaphoid* and the semi-lunar bones.

Hand consists of *carpus* (wrist) *metacarpus* and *phalanges*.

16 *Carpus* (wrist)—each carpus is formed of 8 bones in two rows—*scaphoid*, *semilunar*, *cuneiform*, *pisiform*, *trapezium*, *trapezoid*, *os magnum*, *unciform*.

10 *Metacarpus*—each metacarpus group consists of 5 bones connecting fingers with the wrist.

28 *Phalanges*—each group consists of 14 bones. There are 3 of these in each finger and 2 in the thumb.

Lower extremities (62 bones)—consist of pelvic girdle, thigh, knee-cap, leg and foot.

2 *Pelvic Girdle* (Hip)—each forms by the fusion of *ilium*, *ischium* and *pubis* (*os in nominatum*). These three bones unite at the centre to form a cavity, called *acetabulum*, for the head of the *femur*.

2 *Thigh—Femur*—strongest and largest bone in the body; upper extremity is provided with rounded head to articulate with *acetabulum*; lower end articulates with *tibia* and *fibula*.

2 *Knee-Cap—Patella*—flat triangular bone situated at the anterior part of the knee-joint.

4 *Legbones*—in each leg two bones, *tibia* and *fibula*.

Tibia—head articulates with *fibula* and *femur*. Lower end articulates with *fibula* and *astragalus*.

Fibula—very slender, fixed to *tibia* at both ends, articulates with *tibia* and *astragalus*.

Foot consists of *tarsus*, *metatarsus*, and *phalanges*.

14 *Tarsus* (ankle)—each consists of 7 bones in two rows—*os calcis*, *astragalus*, *navicular*, *cuboid*, three *cuneiforms*.

10 *Metatarsus*—each group consists of 5 bones connecting the toes with the ankle.

28 *Phalanges*—in each foot there are 14 bones—2 in great toe and 3 in each of the remaining ones.

Hyoid Bone (1 bone)—It supports the tongue, horse-shoe in shape, and consists of 5 segments, a body, two greater *cornua* and two lesser *cornua*.

Auditory Ossicles (6 bones)—Ear bones are three in number in each side. They are called respectively the *malleus* or hammer, the *incus* or anvil, and the *stapes* or stirrup.

Thus there are 206 distinct bones in the adult skeleton, made of as follows:—

Skull	...	..	..	22
Vertebral column	...	...	...	26
Ribs with the Sternum	..	..	..	25
Upper extremity	...	...	...	64

Lower extremity	..	..	62
Hyoid bone	...	..	1
Auditory ossicles	..	..	6
			<hr/>
	Total	..	206

CHAPTER IV

FOSSILS AND GEOLOGICAL STRATA

Fossil is derived from the Latin word *fossilis fodcri*, to dig up. Fossil implies petrification or gradual turning into stone of organic materials due to the action of mineral substances on them. Sometimes the actual preservation is intact (e.g. mammoth). Sometimes the specimens are petrified. Sometimes there are natural moulds of the decayed organic substances.

Fossil is the remains of mineral substances of organic origin (i.e. remains of animals and plants) found in the earth or stratified rocks.

Earth's crust is composed of minerals. These minerals form masses called rocks. In geology, rock means all kinds of natural stone, whether hard or soft. There are two varieties of rocks:—

1. *Stratified rocks* lie in layers or strata, as seen in one side of a railway cutting or a quarry.
2. *Unstratified rocks* do not show any trace of layers.

FORMATION OF STRATIFIED ROCKS

When a stream of water flows it carries with it sand, mud and other substances which it dissolves

during its flow. When it enters the sea or a lake its current is stopped and the sediment is deposited in layers. As the sand is the heaviest, it settles first and forms sand stone within a course of time.* The mud is then carried farther, as it consists of smaller particles, and when deposited forms beds of mud. When this bed of mud is hardened it is called *shale*. The soluble matter is used by aquatic animals to form their bones. When they die, their bony remains form beds of *lime stone*. Sand stone, coral, rock-salt, etc. are common examples of stratified rocks.

When in course of time the strata will rise and form land surface, moisture and fertility helping growth of vegetation will soon cover the surface with dense forests. At one time a violent earthquake may sink the surface with the forest, and the place may again help the flow of water over it allowing the repetition of the process of strata formation. The whole process may go on repeating for a number of times forming innumerable strata and pressing down the successive forest vegetation into coal. The pressure will render the strata harder the deeper they sink, and their character will also undergo considerable change. While the animals that roamed about in the forests, or were carried down by or lived in the water, will have their bones turned into stones under the same pressure. The geological examination of the strata enables us to find out a correct estimate of the age of the different stratum—the deeper the stratum the older is its age—and thus we can gather an idea of

the chronology of the appearance of the different animals fossilised or turned into rock in the different strata. The crust of the earth in large parts of Europe, Asia and North America suffered also from the pressure of ice during the glacial periods. Proofs of the occurrence of some four glacial periods have been observed. The surface underwent considerable changes and the strata hardened and helped much in completing the formation of the fossils of flora and fauna. These to-day may be regarded as nature's record of the pre-recorded period of the earth's history, and a systematic study of this is essential for the understanding of the gradual development of different animals leading to the descent of man.

Excavations in various parts of the world has opened up before our views the past and unknown history of the earth. We are now enabled to form an idea of the chronology of animal-life both extinct and present, and place man in his proper order and in proper relation to other animals. To-day we have found out a long chain from the *protoplasmic cell*, through the stages of different animals, monkeys, apes, man-apes and ape-men, to the modern man. Civilised man is not satisfied with merely vague ideas, and researches are constantly being carried on to gather the details of the long history of the gradual appearance and progress of man.

The apes, from which man has descended, have been discovered in the Siwalik Hills in India near Simla. They are the fossils termed *Dryopithecus*

and *Sivapithecus*. The next stage is discovered in Java, the *Pithecanthropus* or the fossil man, and another stage, near Peking in China. Further developed stages have been discovered in Europe, the *Heidelberg man*, the *Pitldozen man*, the *Neanderthal man*, the *Cro-Magnon* and the *Grimaldi*. We shall try to study them in their proper spheres, environmental and chronological, as far as possible.

CHAPTER V

MAIN STAGES IN PREHISTORY

¹ STONE AGE

The stone age is divided into two main periods: *Palaeolithic* and *Neolithic*.

The term *Palaeolith* (*Pal*—old, *lith*—stone) means old stone age, and *Neolith* (*Neo*—new, *lith*—stone), new stone age.

Some scholars believe that certain flints, to which the term '*coliths*' are often applied, show evidence of human works previous to Paleolithic age. But after long discussion and experiments with these '*coliths*,' the presence of any signs of human workmanship in them is universally denied.

Eoliths are the so called dawn of *Palaeolithic implements* and said to be used by man in *Tertiary* times. All these stone fragments were assigned to human workmanship on the ground that they possess *bulb of percussion*. It has subsequently been found however, that similar marks could be produced under rapid torrents. Thus the antiquity of man and his existence can not be proved merely by the bulb of

percussion. .

A chart of the Palaeolithic period is given below :—

Period	Animal	Human type	Implements
Upper-Palaeolithic	Reindeer	Cro-Magnon	Points, Engraving and arts on implements
Mid-Palaeolithic	Mammoth	Neanderthal	Scrapers
Lower-Palaeolithic	Hippopotamus	Piltdown, Heidelberg	Coup-de-poing or Hand axes

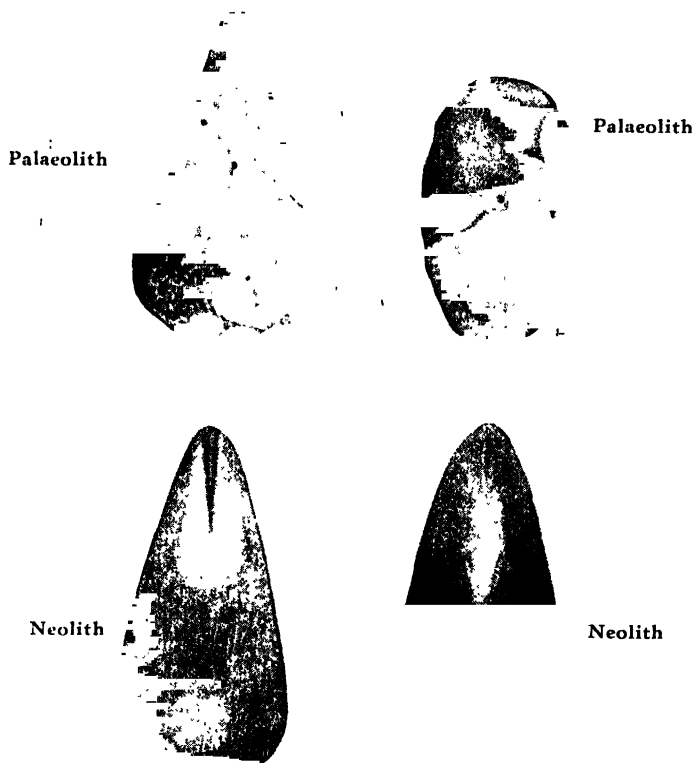
LOWER PALAEOLITH

About fifty years ago a French archaeologist Boucher-de-Perthes found several stone implements associated with animal remains of a warm interglacial epoch. The type of animal is now reckoned to be the hippopotamus, though the southern elephants also continued to survive. The implements found out are now called hand axes or *coup-de-poing*. Two main subdivisions have been recognised, mainly from the type station in France where De-Perthes found them, they are *Chelles* and *St. Acheul* on the Somme.

The *Chellean* implements are a little cruder. They are worked from water worn pebbles with alternate strokes on both sides resulting in concoidal edges in

the *chellean* pieces often apart from the original nodules which are unworked and the flakings are big and rough.

The *Acheulean* type of implements followed the *chellean*. The manner of working was the same



though there was more skill and the implements were finer and generally much better. Four types of these hand axes have been mainly recognised. They are—

1. Almond shaped.
2. 'Poniard shaped.
3. Disc shaped.
4. Triangular shaped.

Some delicate flakes are also obtained in this stage.

These two stages are generally spoken of as the *River-drift culture*. Most of the implements were found in river-terraces. The people were but hunters. They knew the use of fire and lived mostly by river banks. The human remains of these times consist of the *Piltdown* skull and the *Heidelberg* jaw in Europe. *Pithecanthropus* and *Sinanthropus* were probably much earlier. Very little can be recovered of the actual life of these times, though comparisons were often sought with the more primitive people to get some idea. Thus Obermüier, talking of the Andamanese, etc., thinks of the possible existence of people with culture cruder than that of the *Chellean-Acheulean* type, with the use of only thorns and pointed wood and accidentally fractured stone without any regular systematic flaking. These cruder people had no habitation, but erected miserable wind screens to shelter them from the blasts.

From a study of the fossil remains of man we find that *simian* and human characteristics were blended in the same individual. Thus in the *Piltdown* we have a highly developed human skull with an ape like jaw. In the *Heidelberg* jaw the teeth are completely human but the bony portion of the mandible is essentially *simian*.

MID-PALAEOLITH

It is probably in the rigours of the fourth glacial epoch that we get the *Mousterian culture*. Human life retreated into the caves. The typical implements were the scrapers and the pointed instruments. The technique became different, instead of working alternately on both sides, intensive retouches and flaking on the same side produced a sort of stepped ridge. The race that flourished was the *Neanderthal*. From certain human remains it is often conjectured that there existed a cult of the dead and belief in future life.

UPPER PALAEOLITH

There were profound changes in the climate as well as in the racial elements in Western Europe after the mid-Palaeolith. The glacier retreated and cave dwelling *Neanderthal* people were no more. Arid and steppe conditions began to prevail. The reindeer replaced the mammoth and a new race with much higher intellectual development and brain capacity than the *Neanderthal* came to Europe. We no longer find *Palaeanthropic* man, the genera and species who had little relationship with the modern races. *Pithecanthropus* and *Sinanthropus* are pre-chellean representatives of genera widely different from modern man. *Piltdown* and *Heidelberg* are chellean races of the human family, very different yet similar. The *Neanderthal* is a mid-Palaeolithic race, but of the older type. On the other hand the upper Palaeolithic *Cro-Magnon*, *Chancelade* and *Grimaldi* races have

definite affinities with the three living varieties of mankind, viz—the *Caucasic*, the *Mongol* and the *Negro*.

PALÆOLITHIC ART

The outstanding characteristics of upper Palæolithic life is the sudden appearance of arts of the highest type. Not only do we find the weapons and implements of stones and bones to be very delicately shaped and artistically retouched, but all the objects of daily use were decorated and engraved with great skill and marvellous naturalism.

It is true that the *Cro-Magnon* races were far superior in intellect to the preceding *Neanderthal*. It is possible that the environmental conditions had become more favourable. It is very likely that the primitive people had a greater faculty of forming visual images like children or artists. Nevertheless this first outburst of a truly high culture amongst a stone using people, a veritable smile of infant humanity, as Dechelette calls it, is something most remarkable.

The art of the period embraces carving, sculpture, engraving and painting. *Carving* in bone or horn generally of a reindeer is found on the objects of use such as harpoons, spear-throwers, Javelin and dagger-handles, arrow-straighteners and symbols of authority (*Batons-de-commandement*). Some of the works of art are very wonderful, such as the neighing horse from the site of Mas d'Azil. The mammoth, bison, mountain goat, reindeer and fish are delicately worked in horn or bone or mammoth ivory.

Sculpture in stone and bone of human figures,

as well as of animals, shows the variety of their workmanship. The statuettes in ivory of female figurine especially from Brassempouy and Willendorf may show a primitive fertility cult in Western Europe. But the most striking workmanship is seen in the clay statuettes of bison (from 'Tud' Adonbart in Ariege in France) one following the other in close quarters full of realism, masterly technique and wonderful artistic conception.

In *Engraving* also the Palaeolithic art shows its wonderful skill. The movement of animals is very realistically executed. Thus the grazing reindeer or the fleeing reindeer, or the dying reindeer, or the animal looking behind, shows the variety and life of Palaeolithic art. Other animals such as the horse, or rhinoceros, or bear, or swan, are also well executed. Occasionally designs of plans of symbolical human figures are engraved.

But perhaps the highest credit belongs to the wonderful series of *paintings* in red, or red in yellow, or black on the rocky walls of the cave shelters of these times, often in most inaccessible places with the help of lamps lit with animal fat. These master-pieces of art have been drawn with great care. There are three regions in which these cave paintings occur in Western Europe—*Dordogne* and *Pyrenees* in France, and the mountain regions of the north west of Spain. The earliest to be discovered was the classic pictures of the cave of *Altamira* near *Santander*, north west of Spain, discovered by Marquis de-Santuola in 1879.

It is in one recess that we find the famous group of paintings on the ceiling containing the liveliest and the most vigorous portrayals of bisons, running boats, hinds, horses, etc. All are executed in several colours and the naturalistic style beggars all descriptions. It has been well remarked that these paintings have not been surpassed in artistic merit by the greatest productions of the West in later times, for nothing has equalled the vigour of the tracing of the ease and naturalness in thousands of demi-tints.

There are caves which have afforded examples of numerous other paintings of as great antiquity in different styles. The mammoth and the elephant have often been painted along with the horse and the bison. There are also occasional stencil impressions of the hands.

The antiquity of the cave art of this period has been well established. They often depict extinct animals such as mammoth. They were buried or covered by a strata of Neolithic times and so were Pre-Neolithic. They agree in style with the art on the engraved bone and horn pieces of upper Palaeolithic times found in geologically determined layers.

MOTIVES OF PALAEO-LITHIC ARTS—It is very unlikely that these unique specimens of arts were merely the products of leisure. Many of the paintings were executed under very difficult conditions and magico-religious motives were probably the driving force. The animal might represent a totemic ancestor or some totemic cult, but this is highly conjectural. That they

were connected with magic of the hunt or chase is shown by the curious paintings in the cave of three brothers in France (*Les thrys freres*), where we find a man painted as dancing with the mask of a deer, as in the Red Indian magical imitative dances, where somebody personate a bison and is killed symbolically. The upper Palaeolithic cave-paintings are remarkably similar to the Bushmen rock paintings of South Africa. One of the characteristics common to both is that the animals are mostly represented singly. In a fresco with many animals we often find the animals facing in different directions or one painted over the other.

RELIGIOUS IDEAS OF PALAEO-LITHIC MAN—It is very hard to define religion and much more difficult to trace its origin. Of Palaeolithic times, however, we meet with certain remains in such a way as to give us some idea of the belief of those ancient hunters about the supernatural or of the other world. The belief in immortality or the continuation of life after death seems to be very wide-spread. In Mid-Palaeolithic times we have several bone remains from which we can infer that there was some cult of the dead, perhaps worship of ancestors, as amongst many primitive tribes. Definite rudiments of funeral practices have been discovered in Mousterian, Aurignacian, Solutrean and Magdalenian deposits. Sometimes the bodies were deposited in ditches. On occasions the fossil remains were found surrounded or covered with hard materials such as stones or bones. Ornaments of shell or bone and stone axes were often left with

the dead bodies showing a belief in the other world and life after death to be similar to the prevailing conditions of the times. In some upper Palaeolithic burials we find the use of red ochre on a bed where the skulls were placed.

• These are the few certain indications of Palaeolithic religious belief. From upper Palaeolithic art we probably get some traces of magic, rituals and ceremonies most often connected with dancing. If the statuettes of ivory from Brassempouy etc., be taken to be of cult significance, some belief in the mother goddess, which became so prominent in Neolithic times, would go back to upper Palaeolithic.

MESOLITHIC CULTURE

Between the Palaeolithic and Neolithic there is a series of cultures which connect the two in Western Europe. There is no longer the view point that a wide gap separated the two cultures of hunting and agricultural stages. These are variously known as Epi-Palaeolithic or Mesolithic or Proto-Neolithic.

We can roughly differentiate between the earlier stages which nearly continue the Palaeolithic culture in a sort of decadent face. There are others which see the dawn of elements constituting the Neolithic culture complex.

AZILO-TARDENOISIAN—In France proper we have in the South the type station of *Mas d'Azil* on the river Arise discovered by Piette in 1877. Here was found a succession of layers from the upper Palaeoli-

thic to Neolithic and Metallic times, the Azilian occupying an intermediate position. The main characteristics of the culture are:

(1) Harpoons of stagbones, which are much inferior to the beautiful Magdalenian reindeer harpoon in workmanship and style.

(2) The art has degenerated into symbolic representations, and the realistic upper Palaeolithic art has completely disappeared. The art is represented on pebbles marked in wreck often resembling *Alpha-Beta-form* signs but really crude conventionalisation of the human figure. They have been compared with the signs on Australian *churingas* and thought to have some connection with an ancestral cult.

(3) The stone implements have become very small—small discoidal scrapers that might have served as chisels and pairing knives, or sometimes as arrowheads.

THE AZILIAN culture might have entered France from the South as a general drift via Spain of the *Capsian* (from Gafsa in Tunis) culture of North Africa, or it may be regarded as a degenerate continuum of upper Palaeolithic.

TARDENOISIAN—The type station is *Perc-en-Tardenois* on the river Rhine. The most characteristic type is the geometric stone implements—triangular, crescentic, trapezoid, rectangular, etc. in shape. The industry is *microlithic* and there are no painted pebbles. These pygmy flints as they are called are largely distributed from North Western Europe almost right

up to Japan: They have been abundantly found in India in the South as well as in Chotanagpur and Vindhya hill regions.

MAGLEMÖSE CULTURE (*Ancylus*)—The Danish culture stations—Denmark has become a most fruitful source of the study of the Post Tardenoisian phases. Geological conditions closed up the Baltic for a certain length of time and turned it into a lake. This has been called the *Ancylus* lake. The rigours of the glacial age have disappeared and the steppe life of the upper Palaeolithic times has also gone. The birch, aspen and pine began to cover up the area of Northern Europe into a huge forest. A tribe of food gatherers using heavy tools made generally of stag-bone and of hard stone-like gneiss with dogs as their domesticated animals repaired every summer to small lagoons to hunt and fish. Their implements were characterised by pick and tranchets or hatchets made of stone and mounted in antlers.

This native forest culture of Denmark was centered in its first phase round Maglemose and is now called the *Boreal* period. This extended round the North Sea.

KITCHEN-MIDDENS (*Littorina*)—The next phase saw the opening up of the Baltic which became connected with open sea, and this is known as *Littorina* phase. The climate was of the Atlantic type. Fresh and abundant food supplies were offered by the oyster banks of the new sea, opening up the possibility of a superior life. The horn and bone were replaced.

by harder materials and Denmark became a focal area round about the *Ertebolla Kitchen midden* or shell mounds (*Kjokken Moddings*). The climate was warmer, the oak ousted the pine from the forest, and the elk was dying out. The forest tribes of this period were more numerous and occupied the settlements throughout the year. They made flints, picks and hatchets. There were burials in the settlements.

CAMPIGNIAN CULTURE—It is so named from the type station in the department. It is a contemporary of the kitchen midden culture of Denmark and may be considered as Proto-Neolithic owing to the presence of pottery and some domesticated animals. The typical implement was the pick and the tranchet or hatchet in durable stone. There are also some minor implements but none of them are polished. Rough awls, scrapers, cores and arrowheads were in use. The industry also flourished in Belgium.

NEOLITHIC

With the Neolithic epoch and cultural phase we practically begin the modern age of agriculture. Man no longer lived by hunting and food growing was invented (perhaps by women) in some Old World centre, and must possibly independently in the New World centre of Mexico and Peru. The plants cultivated in the Old World were wheat, barley, millet, rye in the Western Zone and rice in the South Eastern Zone. In the New World maize and potatoes were the chief staple food. In the Oceanic area we get the crude cultivation of arum (*Taro*) the know-

ledge of which was probably derived from Eastern India.

Studying the mummies of ancient Egypt of Predynastic period, it has been ascertained from their intestinal contents that they ate a type of cultivated barley or wheat. The barley was of six rowed type and possibly obtained from Syria according to Peake. In the Neolithic lake dwellings of Switzerland we get traces of both wheat and barley. Rice was cultivated very early in some regions in East India, Malayasia and China.

DOMESTICATION OF ANIMALS—The earliest domesticated animal dog, according to Zeller, is probably from a Tibetan species. The dog is a companion of the Arctic Eskimos, the Australian Savages and also of the people living in far distant islands. The remains of dog occur in Mesolithic deposits of Denmark. It seems that dog was domesticated by 8,000 B. C. The domesticated fowl has long been ascertained to be the descendant of some wild species of the combed variety which is obtainable only in Assam, Chittagong and Burma. The domesticated banded pig, as found in the Neolithic lake dwellings of Switzerland, probably came from an eastern variety. Cattle, sheep, goats, and horses were also domesticated in Neolithic times (2300 B.C.). The horse was domesticated probably in the steppes of Central Asia. The horse was known in Babylonia by 2300 B. C. The ox was a special object of veneration in early Egypt, Sumer and the Indus valley cultures.

It is rather remarkable that in eastern part of Asia and among the primitive tribes of Assam and Chotanagpur though cattle is known and used for the plough there is an avoidance of milk which was considered to have such a magical potency in ancient Egypt.

In the New World, specially in Peru, new types of animal, Llama and Alpaca, were domesticated very early. In fact, the Old World civilization is distinctive for its cattle, cereals, wheat, plough, as Wissler quotes it, all of which are absent in the New.

The centre of higher culture in the New World was between Mexico and Peru, whence spread agriculture, pottery, weaving etc. both north and south. In the Old World the oldest centres of civilization were Egypt, Mesopotamia, North-West Persia, Central Turkestan and the Indus valley. Thus somewhere between the Nile and the Indus there might have arisen the great new stone age culture complex in two different stages, the early Neolithic and full Neolithic.

POTTERY making is a complicated process requiring great selection in the clay material and choice of the proper mixture of a carbon material for the pot to be able to take fire without cracking. Hand-made pottery is done by moulding, modelling and building. Often it was begun within a basket from the bottom and coiled round and round. Later on with the help of a wooden paddle and an anvil it was beaten into shape. After the introduction of the wheel the pots were smoothed by being placed on a wheel either turned by the hand or by the foot.

Pottery occurs very early in Neolithic age. It is not universal. There are some regions like Polynesia where the earlier wooden vessels or gourd cups were only in use. Wheel-made pottery is of still more restricted distribution. Hand-made pottery is found in America and parts of Africa as well as in other parts of the Old World, but wheel-made pottery is absent in the New World and parts of primitive Africa. From a distribution of different types of hand-made and wheel-made pottery, Gifford is of opinion that the centre of the dispersal might be somewhere in the Old World where the wheel was invented.

The wheel is not found in the New World (Pre-Columbian America). Early wheel vehicles have been found specially in *Terracotta* models from Crete, Egypt, Mesopotamia and the Indus valley sites of 3,000 B. C. The wheel was possibly associated at first with cattle culture. Wheels were made of solid rolling blocks of wood being later on replaced by solid wheels, which gave place to wheels with spokes. Somewhere between the Nile and the Indus valley the wheel was probably invented and applied to pottery, spinning and traffic.

WEAVING is a complex process and began with mats before the discovery of cotton and linen fibres. The simple tension loom, one part wound round the waist and the other fixed to a pole, is very widely distributed in the Pacific and is still the common type in primitive Assam.

Weaving was gradually perfected through several

steps, e.g. addition of the heddle and alternate raising of either part of the warp and the use of treadle. It appears to have been in use in India very early. The modern mill has replaced man's power by steam or electric energy, but there has been no real or substantial change of the different parts of the simple treadle loom.

COMMERCE—The Neolithic age also saw the development of maritime traffic by means of boats and canoes made fit for sea with outrigger, as in the Pacific, and the addition of mat or cotton sails. Several articles, such as amber, jade etc., were objects of commerce through extensive areas in Europe. The trade routes in Europe ran from the South to the North and along the Danube. The caravan routes in Africa are very old. The coastal trade of Asia also goes back to very early times. The introduction of the horse and the wheel revolutionised traffic and brought about mass movements and conquests towards the latter part of the Neolithic times.

MEGALITHS are large stone monuments. The stones are generally rude and unworked. They are of various types. The most important are:

1. *Dolmen* (*dol*—table, *men*—stone)—two or more vertical stones supporting a horizontal stone.
2. *Menhir* or tall stone or single upright stone. It may be arranged in several rows or lines and called *Alignment* or may be arranged in a circle and called *Cromlech* (*Crom*—curved, *lech*—stone). Sometimes the tall stone in a row may be covered up to form a

passage and called *Allecouverte* (covered passage). There is a distinct architectural technique. The block was set up on its edge and no mortar was used when the horizontal courses were laid.

The dolmens have been known over a vast geographic zone which on the east commences in India and includes Syria, Caucasia, Crimea, several parts of the southern shores of the Black Sea, North Africa (Sudan, Tripoli, Tunis, Algeria), Spain, Portugal, France, British Isles, Belgium, Holland, North Germany, Denmark, and South West Sweden. In Europe the single chamber dolmen later on developed into many chambers surrounded by a circle or a covered passage added to the central chamber. The best example is the 'stonehenge' of South England.

Megaliths in Europe generally begin in Neolithic times and continue right up to Bronze age.

In India there are some *Megaliths* which may be as old as Neolithic times, but most of them contain iron implements. *Megaliths* in India are generally crowded towards the South. According to Dr. Ghurye the types found in India are mostly like the types found in Europe, viz.—rock cut tombs, several varieties of pure dolmens, underground cists, degraded dolmens, three sided dolmens, cairns or tumuli, stone circles, trilithous, menhirs, alignment and pottery stone. Dr. Ghurye comes to the conclusion that India ought to be regarded as the home of dolmen proper.

Megaliths were once regarded as the creation of a single race. But this is not possible, for long-headed

and broad-headed crania have been found from Megaliths in Europe. The different megalithic structures in different parts of the world may be considered to be independently evolved. But at least in the case of the dolmens the affinities are so many that interconnections are most likely the cause.

It is possible that all these structures are due to the spread of one single culture complex from one centre. Dr. Elliot Smith thinks that a dolmen idea originated from a degenerated type of Egyptian funeral monuments called the *Serdab* and it spread from Egypt east and westwards. The difficulty of this theory is that dolmen proper is absent in Egypt.

The rude stone structures in India at least are functionally different in different areas amongst tribes which still raise them. Thus in Chotanagpur similar Megaliths or rather Menhir like stones serve the purpose of funeral monuments amongst the Mundas etc., and in Assam also they are used as funeral monuments. Many tribes like the Nagas erect slabs in commemoration of performing certain sacrifices which give them social status and are recognised as *genna* stones. Thus the origin of dolmens, menhirs and other Megaliths is still unsolved. But likely one common stone erecting idea originated and spread among almost all the people in very early Neolithic times.

LAKE DWELLINGS—During the summer of 1824 the water of lake Zurich in Switzerland dried up and revealed the vestiges of an extinct civilization in the

midst of the lake. It appeared that a dense population was maintained in wooden habitations built on piles in the shallow water of the lake. The site Robenhausen was the most important. The lake dwellings were built towards the end of the Neolithic times and continued till the end of the Bronze age. They are similar to the pile dwellings of Borneo.

In the Swiss lake dwellings each had its loom. Spinning and weaving were generally practised. The domesticated animals, such as cattle, sheep and swine, were reared. Ten thousand piles were used in a single area for the houses. The *crannogs* of Ireland are similar. In Italy there were *terra-mara* settlements on drylands of a similar type. Other Neolithic habitations were found in caves or in river banks or in maritime areas.

The Neolithic weapons and implements consisted of different types of stone celts, arrow-heads, flint-knives, spearheads, ring-stones, hammer stones, pounders and different types of pottery.

The pottery of Neolithic Europe was at first hand made and mainly of two types—

(1) Vases with the impressions of matting or woven stuff (corded ware).

(2) The second variety had bands incised on it (banded ware).

There was a third type which in shape was like a calyx (Calyxiform ware).

In Neolithic times it seems that the worship of a mother goddess and the performance of agricultural

rites for fertility of the soil were widely prevalent. Terracotta female figurines have been found over an extensive area. In ancient seats of agricultural civilization the mother goddess was worshipped in most places.

NEOLITHIC STONE INDUSTRY—Neolithic culture in Europe is characterised mainly by the following:—

1. Ground and polished stone implements.
2. Rude stone structures (Megaliths in several parts of Europe and Asia).
3. Agriculture, pottery, weaving and commerce.
4. Land habitations and workshops.
5. Lake dwellings.
6. Worship of Mother Goddess (Terracotta and Stone).

Of the stone implements of the Neolithic period the most characteristic are the *celts* or *axes*. These were generally narrowed to a point at the butt where it was hafted. The blade was very sharp. There were mainly three types, with cylindrical, rectangular and triangular cross-sections. Their length varies from 20 to 440 m.m. In India we had the smallest as well as some of the biggest specimens. The round cylindrical types seem to be more common and older. In the Eastern tracts specially in the north we have the rectangular types. In Assam and Burma later type, the *shouldered celt*, comes into prominence. This is the predecessor in stone of the hoe type in that area. It has been thought that the distribution of this type

follows that of the peoples speaking branches of the Austro-Asiatic languages and spreads from Chotanagpur to Assam, Burma, Malay Peninsula, right up to the Pacific. The celt was used as a weapon and also as a tool. The adze was often combined with the celt, only the method of insertion of the handle was different. The chisels were merely long types of celts with a groove on one side. The gauges were meant for drilling holes. The celt developed later on by having crescentic blade and still later holes were drilled right within the stone axe.

DIFFERENT CHARACTERISTICS OF THE PALÆOLITHIC AND THE NEOLITHIC AGES

PALÆOLITHIC	NEOLITHIC
1. Climate colder than to-day.	Like modern climate.
2. Fauna of extinct species.	Fauna almost modern.
3. Dolichocephalic people, hunters, elementary social life.	Dolichocephalic and brachycephalic people, cultivators, advanced social life.
4. People mainly living in caves.	People living in open air, huts, Lake-dwelling etc.
5. Absence of domestication of animals and agriculture.	Both present.

Geological Periods		Cultural Periods
QUATERNARY (Man) (125,000 yrs)	Holocene	Iron
		Copper & Bronze
		Neolithic
	Pleistocene	Mesolithic
		Palaeolithic { Upper Mid Lower
TERTIARY (Mammals) (2,500,000 yrs)	Pliocene	
	Miocene	
	Oligocene	
	Eocene	
SECONDARY (Reptiles) (3,750,000 yrs)	Cretaceous	
	Jurassic	
	Triassic	
PRIMARY (Fish) (18,750,000 yrs)	Permian	
	Carboniferous	
	Devonian	
	Silurian	
	Ordovician	
	Cambrian	
ARCHAEAN ? (Invertebrates) ?		

Cultures		Human types	
La Tene Hallstatt			
.....		Nordic Alpine Mediterranean	
Campignian			
Kitchen midden			
Maglemosean			
Asturian			
Azilo-Tardenoisian			
Magdalenian		Chanceladé	
Solutrean			
Aurignacian		Cro-Magnon	
Mousterian		Grimaldi	
Acheulean		Neanderthal	
Chellean		Pitldown	
		Heidelberg	
		Sinanthropus	
		Pithecanthropus	
Rostrocarinates etc.			

(Neanthropic)
Modern man(Palae-anthropic)
Ancient man*(Palaeolithic & Neolithic differences contd.)*

- | | |
|---|---|
| 6. Stone implements dressed in simple ways, absence of pottery. | Stone implements finely polished, pottery, weaving, commerce etc. |
| 7. Absence of stone erections. | Primitive architecture, megalithic monuments. |
| 8. Well developed arts. | Rudimentary arts. |
| 9. Religious ideas primitive. | Complicated religious ideas. |

CHAPTER VI

EARLY TYPES OF MAN

PITHECANTHROPUS ERECTUS OR JAVA MAN

In 1890 Dr. Eugene Dubois, a Dutch army doctor, discovered at Trinil, a village situated on the bank of the river Solo in Java, a skull cap, a femur and two teeth (upper molar), together with a large number of various animals, e.g. two species of Rhinoceros related to the existing Indian forms, Hippopotamus, three species of Stegodon and especially the species *Stegodon Ganeza* as well as *Elephas Hysudricus*, Carnivores, giant *Pangolin*—a monkey, etc. The layers also contain many plant impressions.

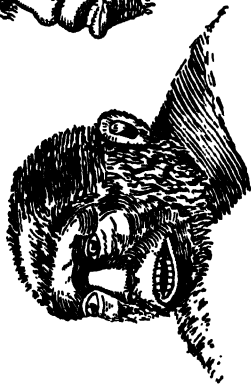
Its affinity with the fauna of India indicates that at the period when animals at Trinil lived in Java, this island was connected with the continent of Asia. The age of the Pithecanthropus has been well established by the fact that the associated fossil fauna of Trinil and that of the Siwalik Hills in India are similar, and thus the attributed age of the Pithecanthropus layer is upper Pliocene, according to Dubois. Later on in 1906 Madam Salenka explored the site and got a tooth (pre-molar) and a part of the lower jaw.

A STUDY OF THE BONE REMAINS OF THE

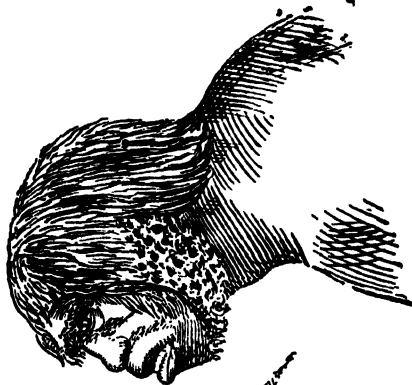
PITHECANTHROPUS

SKULL CAP—It measures 0.185 m. in length and 0.130 m. at its greatest breadth, with a cephalic index 70, and thus the skull is classed in the dolichocephalic group. Notwithstanding its huge dimensions it presents at first sight a simian feature due specially to

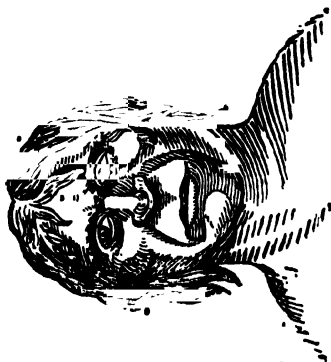
EARLY TYPES OF MAN



Early Palaeolithic Man
(Pithecanthropus)



Mid Palaeolithic Man
(Neanderthal)



Late Palaeolithic Man
(Cro-Magnon)

flattening in a vertical direction. The capacity of the whole skull is estimated at about 850 c.c.; thus it is intermediate between that of the highest ape and of the lowest man. The bones of the cranial vault are completely fused and sutures can not be distinguished. The supra-orbital ridge is continuous. The forehead is narrow and receding (Simian). The temporal lines are not prominent. The nuchal plane of the occipital bone is more inclined than in the anthropoid apes and less so than in modern man. The height of the skull is short. According to Keith, the frontomalar region is that of an ape and unlike that of a man.

Altogether three teeth have been found, one premolar and two upper molars. Each is of larger size than the corresponding human tooth even of the largest dentition. The roots of the molars are divergent, a simian character, but the crowns are like those of modern man. Thus both the simian and human characters are blended together. But according to Gregory they are more simian in nature than human.

FEMUR—The femur found is of the left side and complete. It is straight and very long and in many respects it is so human that it can be easily attributed to a Pliocene. In short the study of the femur indicates that its possessor had the faculty of standing and walking upright.

As regards the geneological relations of the *Pithecanthropus* to man there has been much controversy amongst the scientists. Dubois thinks that the

Pithecanthropus stands in the direct ancestral line of man. Osborn, Gregory and Keith think that the *Pithecanthropus*, though not a direct ancestor of man, is in the line of his grand-uncle, being the result of a branching off from the human stem at an early stage in its development. Lastly Boule regards the *Pithecanthropus* as standing on a branch of the anthropoid ape stem and consequently related to man.

SINANTHROPUS OR PEKIN MAN

In 1919 Dr. J. G. Anderson discovered rich fossil beds in the neighbourhood of Choukou Tien 37 miles Southwest of Peking in China, and in 1921 he found the main deposits. In 1921 and 1922 Dr. O. Zdansky, after excavating this site, collected a fossil material and sent that to a laboratory in Pupsula. In 1926 Dr. Anderson announced the discovery made by Dr. Zdansky of two human teeth in the fossil beds of Choukou Tien, at a scientific meeting held in Peking. The evidence provided by the remains of horses led both the scientists to consider that the human remains might belong to upper Pliocene period and represent the first evidence of the Tertiary man so far discovered. Subsequently the intensive study of the fossil remains made by other anthropologists, has led to the identification of the horizon as lower Pleistocene.

The teeth discovered are one right upper molar and a lower front molar. The characters of the right upper molar are essentially human. In 1927 Dr. B. Bohlin found in lower Pleistocene beds a human lower

molar tooth and sent it to Dr. Black for examination. Dr. Black made a comparative study with man and higher apes and said that it occupied an intermediate position between them. In 1928 the place Choukou Tien was excavated and a greater part of the right side of ramus of an adult jaw was discovered. It presents peculiarities of the human mandible. In it were preserved three molar teeth, the sockets of the premolar, canine and incisor. The fragment of the jaw was ultimately associated with a parietal bone which is more capacious than that of the *Pithecanthropus*. Dr. Black definitely says that it is human in form.

In 1929 Mr. W. Pei found out almost entire brain case of an adult skull. The brain case is more complete than the remains of either *Pithecanthropus* or *Eoanthropus*. The brain case is thicker and the eyebrow ridges are small. The sutures in the skull are complexly edentated. The frontal bone is retreating and not highly arched. The frontal and the parietal regions are slightly bulging which are lacking in the skull of the *Pithecanthropus*. The expansion of the parietal region closely resembles that of the Piltown. According to Boule the peculiarities of the undersurface of the temporal region are more markedly pronounced in the *Sinanthropus* like those of the Neanderthal (La-Chapelle) and apes but unlike those of modern man. The occipital bone slopes abruptly but in man it is arching. The articulation of the jaw is like that of a modern man but the mastoid process

resembles the condition often found in Gorilla. The following points are to be remembered regarding the teeth of the *Sinanthropus*:—

1. Large teeth.
2. Last molars smaller than others.
3. Antero-posterior and transverse diameters are equal.
4. Cruciated arrangements are found.
5. The molars have 5 cusps and the roots are divergent.
6. Space after last molar is seen (a simian character).

Altogether the teeth are human though primitive in nature.

Sinanthropus differs from all the early types of man, having similarity to *Pitldown*. Hence it occupies the intermediate stage between *Pithecanthropus* and *Pitldown*. In conclusion, it can be said that *Sinanthropus* is more or less human and also bears certain simian characters, i.e., it is rather a primitive man.

SINANTHROPUS AND PITHECANTHROPUS

SIMILARITIES

1. Supra orbital torus.
2. Retreating forehead and metopic ridge.
3. In the occipital region abrupt retreat of the nuchal portion.
4. Height of the skull short.
5. External occipital crest.

DIFFERENCES

Sinanthropus distinctions:—

1. Sutures distinctly tortuous.
2. Height of the skull greater.
3. Frontal and parietal nearly equal.

SINANTHROPUS AND NEANDERTHAL

1. Supra orbital torus.
2. Frontal bone receding.
3. Flattening of the top.
4. Squamous more developed in Sinanthropus and nuchal portion not so retreated.
5. Length and height of ramus broad and massive
" in Sinanthropus.
6. The angle formed at the gonion is truncated.
7. The lower border of the mandible is concave and slightly convex.
8. Chin absent.
9. The condyle is at a higher level than the coronoid.
10. The sigmoid notch is narrow.

SINANTHROPUS AND HEIDELBERG

1. Abrupt rise of ramus.
2. Symphyseal region in both cases nearly equal.
3. Body of the mandible is high and the simian shelves are noticed.
4. The two limbs of the dental arch diverge.
5. Teeth are all on the same level.
6. Canine large and no diastema.

HEIDELBERG MAN

In 1907 Otto Schoetensack found in the sands of Mauer village in Heidelberg, Germany, one complete lower jaw.

The Mauer sands are very rich in fossils. The associated fauna are ancient elephant, Etruscan rhinoceros, mosbach, bison, bears etc. Thus it yields a typical Chellean fauna and the bed corresponds to other early Pleistocene deposits of Europe.

From the study of the topographical and stratigraphical conditions of the Mauer river formation it is quite reasonably said that the Mauer jaw belonged to one of the oldest workers of the Palaeolithic men.

The Mauer jaw is of great size and massive and powerful in appearance. The ascending ramii are broad and low, and the chin is completely absent. All these point to its simian feature.

On the other hand the dentition is altogether human, both in its entirety and in the details of its characters. The alveolar borders are parabolic in shape instead of U form as we find among the simians. The canine is almost like that of the modern man. The teeth are regular and systematic and no diastema is noticed. The premolars and molars are also quite human in character. Although the molars have 5 cusps (simian characteristics), the 5th cusp is not well developed. Thus from the morphological characters of the jaw it is found to be a well proportioned blending of simian and human characters.

Considering all the points it would seem that the Heidelberg man represents the Neanderthal man in making. Woodward says that the Heidelberg man is in the same line with modern man. But according to Boule the Heidelberg man and the modern man

belong to two different species.

EOANTHROPUS OR PILTDOWN MAN

While working near Piltdown in Sussex in England one day one of the workmen presented to Mr. C. Dawson, a fragment of a human parietal bone, very ferruginous in appearance. Later on in 1911, Mr. Dawson found out a fragment of frontal bone larger than the first one. This find was immediately sent to Dr. Smith Woodward who promptly understood its great value and by common consent a further excavation was carried out in 1912.

The associated fauna are rhinoceros, hippopotamus and deer etc. The implements found during the course of excavation are scrapers and some Pre-Chellean implements. The age assigned by some authors is the second inter-glacial period, and this view is supported by the stratigraphy, palaeontology and archaeology.

The following bone remains supposed to be human were found: nasal bones, some teeth (canine and two molars), right ramus, some parts of occipital, temporal and parietal bones. The bones are thick. The frontal bone is not so developed as in man. The glabella is prominent. The supraorbital ridges are developed but not so as is found among the human group. The coronal suture is complexly edentated. The temporal curve lines are high and the occipital bone is remarkable for its development in a transverse position. The cranial capacity is calculated to be 1300 c. c. The nasal bones are human in character. The human jaw.

is lighter than that of the Piltdown. The arch of the jaw is simian. The canines are large and prominent and a diastema after canine is noticed. Thus the jaw is out-and out simian.

Some anthropologists are inclined to believe that the Piltdown skull belongs to one individual, and the jaw to a Pleistocene species of higher ape (chimpanzee). While others say that both the skull and the jaw belong to the same individual. They say that the skull was developed due to some physical cause while the jaw was not equally developed. So they called it *Troglodyte*.

Woodward says that the Piltdown man is branched off from the main human stem. But Schwalbe, Boule and Elliot Smith say that the Piltdown man is in the direct line with modern man.

NEANDERTHAL MAN

Numerous fossils are found in various places which are attributed to the Neanderthal man. The important discoveries are:—

1856—Neanderthal	Dusseldorf, Germany	Skull cap and skeletal fragments.
1864—Gibraltar	Forbes Quarry	Fragmentary skull.
1887—Spy I & II	Near Dinant, Belgium	Two skulls and skeletons.
1892—Taubach	Near Weimar	One milk tooth.
1899—Krapina	Croatia, Austria-Hungary	Portions of many skeletons of adults and children.
1908—La Chapell- aux-Saints	Correze, France	Almost complete skull and skeleton.
1908—Le Moustier	Dordogne, France	Portions of one skeleton.
1909—La Ferrassie I	Ditto	Ditto.
1910—La Ferrassie II	Ditto	One skeleton.

1910—La Quina I	Charente, France	Foot bones.
1911—La Quina II	Ditto	Skull and fragments of skeleton.
1914—Ehringsdorf	Near Weimar	Lower jaw.

The Neanderthal man belongs to the Mousterian (Mid-Palaeolithic) period. The implements found along with him are scrapers, points, etc.

The Neanderthal man is short. The head is long (dolichocephalic) and flattened, crainal capacity, 1408 c.c. The orbital arches are enormous and form one continuous ridge called supraorbital torus. The forehead is very receding and the occipital region is flat and compressed in a vertical direction. The orbits are very large and round. The nose is prominent and large and the nasal aperture is very wide. The face as a whole projects and the prognathism is due to the projection of the subnasal region.

By a comparative study of the skulls of the chimpanzee, Neanderthal and Australian, Schwalbe notes that the Neanderthal skull is really an intermediate form between that of anthropoid ape and modern man.

The jaw is less powerful than that of the Heidelberg man. In the Heidelberg man complete absence of chin is noticed, but in the Neanderthal slight prominence is suggested. So Boule agrees that the chin in the Neanderthal was only in a forming process and attained an infantile form. The dentition is distinctly human in character though it retains certain primitive features.

AUSTRALIAN AND NEANDERTHAL—The Australian

type of head is alike the Neanderthal in the region of forehead and nose. The distinguishing characters of the Neanderthal: retreating forehead, flattening of occiput, retreating chin, prominence of supraorbital ridges.

CRO-MAGNON MAN

In 1868 Dartet discovered five human skeletons in a grotto in Les Eyzies. They are one old man, two adult men, one woman and an infant.

The stature is high with very broad face and narrow orbit (rectangle). The head is long (dolichocephalic) with a cranial capacity of 1800 c.c., surpassing that of the average man of to-day. Verneau emphasises the disharmonic form of the head—the long head combined with a broad face—as the most distinctive feature of the Cro-Magnon people.

The forehead is broad, vertical and convex in the medial line. The nose is narrow and aquiline and the whole face seems to be that of a modern man. The eye-brow ridges show prominences above the orbit but disappear in the medial line and sides, thus differing from the Neanderthal. The top view of the skull is unusual on account of the prominence of the parietal which gives a pentagonal shape. The mandible is thick and strong. The chin is prominent, massive and triangular in shape.

The associated implements are of Aurignacian times, and the reindeer is found.

The antiquity of this man, according to Osborn, is 25000 years.

GRIMALDI MAN

In 1901 the skeletons of an old woman and a young man in close contact were found in the grottoes de Grimaldi near Mentone in France.

The stature of the female is 157.0 c.m. and that of the male is 155.0 c.m. Hence the stature is short. The forearm is proportionately longer than the arm and similarly the leg longer than the thigh. Thus the lower extremity is proportionately longer than the upper extremity.

The cranium is voluminous and disharmonic with a cranial capacity of 1580 c.c. The shape of the skull is long and regular (C.I. 68 and 69). The frontal arch is well developed, the parietal slightly flattened and in the occipital region a rapid receding is noticed. The glabella is well developed and the supraorbital arches are slightly developed medially. The orbits are large and rectangular. The nose is platyrrhine (broad). The prognathism is greatly marked. The lower jaw is high with broad ramii and the chin is formed. The teeth are large. The molars are large, have 5 cusps and the third molar smaller than the others.

The Grimaldi man is found in the transitional period between Mousterian and Aurignacian periods.

DIFFERS FROM NEANDERTHAL

1. Leg very long in comparison with the arm.
2. Long fore-arm in proportion to the arm.
3. Long shin bone contrasted from the thigh.

DIFFERS FROM CRO-MAGNON

1. Stature short.
2. Slenderness of skeletal parts.
3. Cranial characters.

SIMILARITY TO CRO-MAGNON

1. Broad face.
2. Rectangular eye.

CHANCELADE MAN

In 1888 a skeleton was found at Raymouden near Chancelade and was examined by Testut. It was found in the Magdalenian layer.

The man is of short stature, 150.0 c.m. according to Testut, but according to others, 159.0 c.m. The skull is dolichocranial with a cranial capacity of about 1710, c.c. •

Above the superciliary arches the broad bulging forehead rises at first vertically and then slopes in the backward direction forming a regular curve. The orbits are large and high and quadrilateral in form. The nose is long and narrow. The face is prominent but shows no prognathism. The alveolar border is elliptical, but in Cro-Magnon it is parabolic. The chin is broad and prominent. The teeth, particularly the molars, are strong. The limbs are longer than those of the modern Europeans. The feet are large.

Prof. Testut points out the resemblance of Chancelade with the Eskimos of Greenland. This view is supported by Prof. Sollas, who says that habits, manners, implements and artistic merits of the Eskimos have similarity with those of the Chancelade.

CHAPTER VII

RACE: CRITERIA AND DISTRIBUTION

RACE is defined as a group of people that has certain characteristics common (physical and cultural) to all the individuals of the group, by way of ancestry. A Race may be classified in two different ways: Physical and Cultural.

In this Chapter we shall first deal with the physical aspects of man. "The physical characters to be studied are: Hair, Skin Colour, Head, Stature, Face, Nose and Eyes.

HAIR—There are three varieties of hair:

1. *Leiotrichy* or straight hair—found among the Asiatic Xanthoderms (Mongoloid people),
2. *Cymotrichy* or wavy hair—found among the Dravidian and Pre-Dravidian groups of India, Hamites, Semites and Mediterraneans.
3. *Ulotrichy* or woolly hair—found among the Negroes, Bushmen, Andamanese, Papuans and Melanesians.

The climatic conditions indirectly account for the character of hair. In the warm moist climate we find woolly hair (*Ulotrichy*). In dry and cold climate we get straight hair (*Leiotrichy*). In the intermediate conditions we have wavy hair (*Cymotrichy*). To observe hair the following things are to be noticed: its form (mentioned above), texture, quantity and colour. Hence for a preliminary grouping of mankind the character of hair plays an important part.

According to Dr. Haddon the character of hair is the basis of human physical criteria.

SKIN COLOUR—"Pigmentation of the skin is due to various brownish granules in the deeper layer of the epidermis." Hence the skin colour is dependent on the frequency of these granules.

Skin colour is divided into three main groups:—

1. *Leucoderms* or white skinned people—Europeans.

2. *Xanthoderms* or yellow skinned people—Mongoloid Asiatics.

3. *Melanoderms* or black skinned people—Negroes.

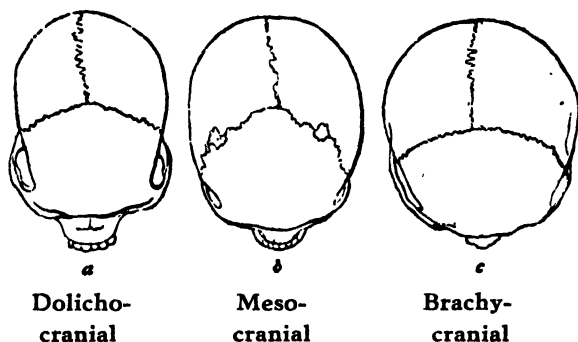
PHYSIOLOGICAL SIGNIFICANCE OF THE SKIN COLOUR—The gradations in the skin colour have a protective value. This we find in the case of the *Melanoderms* against the actinic rays of the Sun and also in the case of the *Leucoderms* against cold. Thus we see that white is the best colour for keeping in the body heat. In the old world the human skin colour is darker towards the equator and fairer when one is away from it. But this rule does not hold good in the new world.

GEOGRAPHICAL AND CLIMATIC CONDITIONS—These conditions go to a great way in the formation of skin colour. But generalisations do not hold good for each and every case when particular areas are taken into consideration, e.g. the Negro of the Congo basin and the pale yellow pigmentation of the Punan of Borneo. Here the time factor plays an important

part in this analogous condition.

According to Haddon the early variation in pigmentation took place spontaneously and independently of the actions of the environment, and thus deeply pigmented individuals having greater adaptability to sustain tropical conditions outlived the rest in the long run. The reverse process would take place in the cooler countries. Besides, the process of sexual selection is also a great contributory factor.

HEAD—The form of the head is a valuable character in racial discrimination. The form of the head can be classified with the help of the length-breadth index, which is known as *cephalic or cranial*



index. The *cephalic or cranial index* can be found out in the following way: The length and the breadth of the head or the skull are found out by means of Martin's callipers and then the breadth is multiplied by 100 and is divided by the length ($B \times 100 \div L = C.I.$), i.e. the *cephalic index* expresses the breadth of the

head in terms of percentage of the length of the head. When the index varies from 70—75 the skull is a *Dolichocranial* (long) one. When 75—80 it is termed *Mesocranial* (medium). And when it varies from 80—85 it is *Brachycranial* (Broad). According to Dr. Haddon two units should be added in the case of the living (head) but according to some anthropologists, e.g. Martin, one unit is to be added.

Cranial and cephalic indices after HADDON—

CRANIAL		CEPHALIC
70—75	Dolicho—	—77
75—80	Meso—	77—82
80—85	Brachy—	82+

MARTIN'S classification

Dolichocephalic	X—75.9
Mesocephalic	76.0—80.9
Brachycephalic	81.0—85.4

The height of the head is to be taken into account when the form of the head is considered. The length-height index of the head or *Altitudinal index* can be similarly found out. When the index is 58 it is *Platycephalic* or *Chamacephalic* (i.e. head is low and flattened), 58—63 *Orthocephalic* (head height is medium); from 63 upwards, *Hypsicephalic* (head is high and well arched).

Classification of *Altitudinal index* of Haddon:

CRANIAL		CEPHALIC
—70	Chamae—	—58 Platy—
70—75	Ortho—	58—63
75+	Hypsi—	63+

MARTIN

Chamaecephalic	.. X—57.6
Orthocephalic	... 57.7—62.5
Hypsicephalic	.. 62.6—X

STATURE—Among the physical characters of human beings stature stands in the first place. Stature increases from the embryonic stage up to the attainment of puberty and then it remains constant for a long period of time (i.e. 18th—30th year), and in advanced age (i.e. when old) it suffers a reduction of about 3 per cent. of its total height. The reduction of stature is mainly due to some processes going on in the body:—process of shrinking, atrophy, compression of interspinal discs, and transformation of the curvature of the vertebral column.

The gradual loss of stature in the case of the Icelanders with age, is given below:—

AGE	STATURE
22—30	... 173.57 c.m.
31—40	... 173.55 „
41—50	.. 173.04 „
51—60	... 170.94 „
61—70	.. 170.00 „
71—80	.. 167.60 „

The human average height, says Topinard, is 165.0 c.m. (5 ft. 5 in.). The medium statured people are the Dravidians and the Hamites. When stature is below 160.0 c.m. (5 ft.) we call the people short-statured. The examples are the Bushmen, the Melanesians, the Kadirs, and the Panians etc. Below

150.0 c.m. (below 5 ft.) we place the people in the very short or pygmy group. The Negritos, the Andamanese and the Tâpiros fall in this group. We call a people tall when its stature is 170.0 c.m. (5 ft. 7 in.). We can place the Nardie, the Jat and the Rajputs in this group.

The scale of stature employed by HADDON :—

Pygmy	...	—148.0 c.m.
Short	. 148.0—158.0	„
Medium	.. 158.0—168.0	„
Tall	... 168.0—172.0	„
Very Tall	.; 172.0+	„

The scale used by MARTIN :—

Pygmy	X—129.9	c.m.
Very short	130.0—149.9	„
Short	.. 150.0—159.9	„
Below medium	... 160.0—163.9	„
Medium	... 164.0—166.9	„
Above medium	.. 167.0—169.9	„
Tall	... 170.0—179.9	„
Very tall	... 180.0—199.0	„
Giant	.. 200.0— X	„

According to Torday, regular life, sunshine and free air are the main causes which bring about a change in stature. A group of people may be temporarily dwarfed by unsuitable conditions of life, but the stature is increased when the conditions are favourable. One example of this has been noticed in the Limousin district of France. The environmental features that appear to have an effect on stature are

climate, locality, food and influence of social selection.

Stature is again dependent upon two factors—Paratypical (environment) and idiotypical (heredity). Physiologists believe that growth of stature depends on internal secretion of thymus, pituitary and gonad glands.

Haddon says, "High stature is partly dependent upon the retardation of maturity, thus allowing a long continued growth."

Lastly, we see that Ripley says, "It would appear that stature is rather an irresponsible witness in the matter of race."

FACE—A harmonic relation exists between the face and the head of a living man. A dolichocephal has a narrow face known as *Leptoprosopy*, and a brachycephal has a broad face, *Chamaeprosopy* or *Euryprosopy*. But we find that there are exceptions to this general order of nature. This disorder is termed disharmonic. If we turn our eyes to the pre-historic times we find that the Cro-Magnon people had long head with broad face. This feature is also met with among the living variety, the Eskimos. But a broad head and a narrow face are the characteristics of the French Basques.

Sometimes it is found that the lower part of the face (mandible) projects to a greater extent. This is known as *Prognathism* (*Pro* means projection, *gnathion*, the lowest point in the middle part of the chin). There are three varieties of prognathism:—projection of the gnathion or lower jaw, projection of

the upper jaw, and projection due to the subnasal region. This prognathism is found among the Papuans. There may be no projection of the face and this is known as *Orthognathous*. This feature is found among the Ainu of Japan.

• **Nose**—The nose is a good feature of attraction. The whole appearance of a man can be changed with the change of the nose. The root of the nose has a depression. This depression may occur in three ways: shallow, medium or deep. The bridge of the nose may also occur in three ways: *Platyopic* (low), *Mesopic* (medium), or *Prosopic* (high). But when seen in profile the bridge may be straight, concave, convex or aquiline, or concavo-convex. The nasal septum may be horizontal, directed upwards or directed downwards.

The form of the nose is expressed in the length-breadth index. It is obtained by dividing the breadth of the nose by its length and multiplied by 100 as we have found in the case of cephalic index ($N.I. = B \times 100 \div L$). The value of nasal index as has been used by HADDON is given below:—

SKULL		LIVING
—47 Leptorrhine	...	55—70
47—51 Mesorrhine	..	70—85
51—58 Chamaerrhine	..	85—100 Platyrrhine

The value after MARTIN:—

Leptorrhine	..	55.0—69.9
Mesorrhine	...	70.0—84.9
Platyrrhine	...	85.0—99.9

The examples of *Leptorrhine* are the Mediterraneans, the Indo-Afghans and the Ainus (68); *Mesorrhine*—the Todas (74.9) and the Nagar Brahmans (73.1); *Platyrrhine*—the Santals (89.2) and the Mundas (90.2).

Dr. Haddan says, "Wide nostrils and a broad nose are frequently associated with hot moist conditions, whereas in regions of cold dry climate the nasal apertures are narrowed so as to warm the inhaled air."

Thomson again holds that nasal index is highly variable under environmental conditions. He says that high indices are to be found in a damp hot climate, and low index in a cold dry climate. Thus we see that the shape of the nose is dependent on 2 factors, temperature and humidity.

The nasal index has been considered by some writers to be a good indication of a race. But here some difficulties appear. The races that appear for other reasons to be quite unrelated have identical indices.

EYES—Eye may be considered as one of the factors of racial discrimination. To study an eye the following are to be noticed:---eye-slits, eye-fold, eye-colour. The corner of the opening portion of the eye is known as *Canthus*. This *Canthus* is of two varieties, inner and outer. Sometimes it is seen among certain groups of people that a fold of skin covers the inner portion of the *Canthus*. This fold is called the *Epicanthic fold*. As its frequency among the Mongols

is very great it is known by the second term, *Mongolian fold*. This fold rises a few millimeters above the free edge of the upper lid in which the eye lashes are placed. If we consider the extreme cases we find that this fold may sag down over the upper portion of the lid and conceal it thoroughly. In such cases we also notice that the lower lid is concealed to some extent. The eye appears to be oblique due to the *epicanthic fold*. But it is to be remembered that all oblique-eyes have not this fold. Amongst most peoples the slit or the opening of the eye is horizontal. The eye is necessarily full and greatly open. But in the case where *epicanthic fold* is traced the eye is small and narrow.

The pigmentation of the iris varies from black to light blue (intermediate colours—dark brown, light brown, grey, green, blue brown, grey brown, dark blue and light blue).

DISTRIBUTION OF HUMAN RACES

NEGRO

There are two classes of Negroes:—

1. Oceanic Negro (Ulotrichy Orientales of Haddon).

2. African Negro (Ulotrichy Africani of Haddon).

OCEANIC NEGRO—Physical characters:—

Hair—Ulotrichy or woolly hair.

Skin—Deep shades of chocolate brown often verging on black.

Head—Dolichocephalic with meso to low brachy-

cephalic.

Stature—Very short, short and tall.

Face—Moderately prognathous to prognathous.

Nose—Platyrrhine.

Oceanic Negro can be divided into two groups:—

1. Papuans and Melanesians.

2. Negritos (Andamanese, Semang, Aeta, Tapiro).

DISTRIBUTION—Most of New Guinea, throughout Melanesia, parts of Australia, South Eastern Islands of the East Indian Archipelago, Admiralty Islands, New Caledonia, Fizi, etc., Andaman Islands, central region of Malay Peninsula and East Sumatra, Philippine Islands, western mountains of Netherlands New Guinea.

AFRICAN NEGRO—Physical characters:—

Hair—Ulotrichy.

Skin—Dark to yellowish.

Head—Dolichocephalic to mesocephalic.

Stature—Very short, short and tall.

Face—Prognathous, but not very marked; orthognathous sometimes noticed.

Nose—Platyrrhine (flat nose).

DISTRIBUTION—Equatorial forests of Africa, more especially in the Congo region, Kalahari desert, South West Africa, Guinea coast, Sudan, Upper Nile Valley.

Negrillo (Akka, Batwa, Bambute), Bushmen, Hottentot, Negro, Negroid (Nilotic Negro or Nilote), and Bantu are included in African Negro.

MONGOLS

Mongols are grouped into three classes:—

1. Southern Mongols.
2. Northern Mongols.
3. Oceanic Mongols.

SOUTHERN MONGOLS—Physical Characters:—

Hair—Leiotrichy.

Skin—Dirty yellowish brown, shading off to olive and coppery brown and to lemon or whitish.

Head—Mesocephalic to brachycephalic.

Stature—Below medium, often tall.

Face—Slightly prognathous.

Nose—Mesorrhine.

Eyes—Small, black with epicanthic fold.

DISTRIBUTION—Tibet, Southern parts of the Himalayas, Indo-China to the isthmus of Kra, China, Formosa, some parts of Malaysia.

This variety includes Bod-pa (Tibetan, Tangut, Balti, Gurkha, Bhutiya, Miri, Abor), Burmese (Naga, Kuki, Manipuri, Arakanese, Burmese proper), Tai-shan (Ahom, Iao, Siamese), Gio-Shi (Annamese, Cochinchinese), Chinese (Chinese proper, Hoklo, Punti).

NORTHERN MONGOLS—Physical characters:—

Hair—Leiotrichy.

Skin—Light or dirty yellowish to white shallow.

Head—Brachycephalic.

Stature—Short and tall.

Face—Slightly prognathous.

Nose—Mesorrhine.

Eyes—Straight, greyish or even blue.

DISTRIBUTION—Balkan peninsula, lower Danube, East Russia, Irania, Asia Minor, Uralo-Caspian basin, Northern Hemisphere from Japan to Lapland and from the Arctic ocean to the Chinese great wall, and Tibet.

In this group are included—Mongol proper (Buryat, Mongol, Kalmuk), Tungus (Manchu), Korean (Japanese), Turki (Yakut, Uzbek, Kirghiz, Anatolian), Finno-Ugrian (Baltic Finn, Lapp, Bulgar, Magyar, Samoyed), and Eastern Siberian (Yukaghir, Chukchi, Koryak, Kamchadale, Gilyak).

OCEANIC MONGOLS—Physical Characters:—

Hair—Leiotrichy.

Skin—Yellowish or olive brown, yellowish tint sometimes very faint or absent.

Head—Mesocephalic to brachycephalic.

Stature—Below medium.

Face—Slightly projecting.

Nose—Mesorrhine.

Eyes—Black, slit horizontal or slightly oblique, often with Mongolic fold.

DISTRIBUTION—Madagascar, Nicobar islands, Formosa, Philippines, and Indonesia.

MAIN GROUPS—Malayans, or Proto Malayas, Battaks, Javanese, Dayaks, etc.; and Malayas proper—Malay Peninsula, Sumatra.

PRE-DRAVIDIANS

Physical Characters:—

Hair—Cymotrichy.

Skin—Dark brown.

Head—Generally dolichocephalic.

Stature—Short or medium.

Face—Prognathous slightly, generally orthognathous.

Nose—Platyrrhine.

DISTRIBUTION—Jungles of the Deccan, North Central India, Chotanagpur, Ceylon, Malay Peninsula, East Sumatra, and Australia.

Pre-Dravidians are: Veddah, Kurumba, Irula, Paniyan, Kadir, Sakai, Oraon, Munda, Kandh, Santal.

CAUCASIC

Physical characters:—

Hair—Cymotrichy.

Skin—White, light olive, all shades of brown and sometimes dark brown.

Head—Dolichocephalic to brachycephalic.

Stature—Medium and tall.

Face—Cheekbones small, orthognathous.

Nose—Leptorrhine.

DISTRIBUTION—All lands beyond tropical areas except China, Japan and the Arctic area, America, India, Arabia, Indonesia. Sporadically almost everywhere.

MAIN GROUPS

1. MEDITERRANEANS—Dolichocephalic head, long narrow face, tawny white skin, nose narrow and large (leptorrhine), stature medium (1.615 m).

DISTRIBUTION—North Africa, Aegian, Sicily, Italy, Sardinia, South France, Iberian Peninsula, Mediterranean Sea and parts of Asia.

Groups of people included in it—Iberians, Corsicans, Italians, some Greeks, Sardinians, Sicilians, Berbers, Hamites, Arabs, Semites, Dravidians, Todas, Indonesians, some Polynesians, Ainus.

2. NORDICS—~~Mesocephalic~~ head (76-79), narrow face, straight fine aquiline nose, reddish white skin, tall stature (1.73 m.).

DISTRIBUTION—France, Sweden, Norway, Russia, Germany, Denmark, Holland, Flanders, Ireland, England, Scotland, Baltic sea, North Sea, North Europe.

Groups of people included in it—Afghans, Dards, West Persians, the Dutch of South Africa, Dutch, Anglo-Americans, some Irish, Scandinavians, North West Germans, English.

3. ALPINES—Brachycephalic head (85), long oval face, nose leptorrhine (62.6—72), white-rosy or bronze skin, tall stature (1.66—1.70 m.).

DISTRIBUTION—British Isles, France, Italy, Western Alps, Switzerland, Bohemia, Balkans, Asia Minor, Russia.

Groups of people included in it—Galcha, Tajik, Armenians, Rumanians, Albanians, Czecho-Slavs, Poles, Russians, Tyrolese, Swiss, South Germans, Some French.

CHAPTER VIII INDIAN PEOPLES: CHIEF LINGUISTIC FAMILIES

SIR HERBERT RISLEY'S CLASSIFICATION OF INDIAN HUMANITY

Risley distinguished seven different ethnic types in the population of India. They are as follows:—

1. THE TURKO-IRANIAN TYPE—The people has broad head, fine to medium nose, fair complexion, dark or grey eyes and plentiful facial hair. This strain is typified by the Balochis, Brahuīs and the Afghans.

2. THE INDO-ARYAN TYPE—This type has long head, fine to medium nose, fair complexion, dark eyes with plentiful facial hair. These characters are found among the Punjabi Rajputs, Jats and the Khattris of the Kasmere valley.

3. THE SCYTHO-DRAVIDIAN TYPE—Fair complexion with scanty facial hair, medium to broad head with medium nose. The Maratha Brahmans and the Coorgs of Western India are typical examples of this type. They are distributed from Guzerat to Coorg.

4. THE ARYO-DRAVIDIAN OR HINDUSTHANI TYPE—The head varying from long to broad, nose broad to medium, light brown to dark complexion, are the features of this type. They are found in the united provinces, in parts of Rajputna and in Behar.

5. THE MONGOLO-DRAVIDIAN OR BENGALI TYPE—The complexion is dark with plentiful facial hair.

Head is broad with a tendency to medium. Nose varies from fine to broad. This type is found in Bengal and Orissa.

6. THE MONGOLOID TYPE—of the Himalayas, Nepal, Assam and Burma. The head is broad, skin colour dark with a yellowish tinge and the hair on the face is scanty. Stature is short or below medium. Nose is from fine to broad. The face is characteristically flat. Eye-lids are often oblique.

7. THE DRAVIDIAN TYPE—extends from Ceylon to the Ganges covering all the portions of South Eastern India. This type is found in Madras, Hyderabad, Central Provinces, most of the Central parts of India and Chotanagpur. The pure type of this variety lives on the Malabar coast and in Chotanagpur. They are probably the original inhabitants of India, and now modified by the infiltration of the Aryan, Scythian and the Mongoloid elements. Head is long, stature short or below medium, skin colour dark. Hair is plentiful with an occasional tendency to curl. Eyes are dark. Nose is very broad but not so to make the face a flat one.

CRITICISM OF RISLEY'S CLASSIFICATION

The first group i.e. Turko-Iranian is now called by Haddon as Irano-Mediterraneus. Leaving out the account of the first three groups and the Mongolian, we shall examine the Mongolo-Dravidian, the Scytho-Dravidian and the Dravidian in the light of recent researches.

In accounting for the broad headed element in the Bombay Presidency Risley lays too much stress on the Scythian element in its population. But the Scythian invaders remained for too short a time to exert any influence on such a vast multitude of people in the Bombay Presidency. So Risley's theory does not hold good. But the real cause will not be ascertained until we examine the group, Mongolo-Dravidian. Bengal is, according to Risley, peopled by brachycephalic people, and in accounting for the broad headed factor Risley takes the Mongolian influence as the cause. But an examination in the outskirts of Bengal shows that the racial elements in these parts are not homogeneous. The brachy-platyrrhine elements are predominant in the South Eastern part bordering on Burma, while the dolicho-platyrrhine elements are strong in the Brahmaputra valley. Again the brachy-leptorrhine is predominant in the Sikkim region with the gradual decrease towards the north and the east.

In accounting for the racial anatomy, not only shall we take the nasal index but also the orbito-nasal index of Topinard. So Risley was right in taking this index, but it should be noted that he did not use it except in solitary cases. So Risley's conclusion is not justified on the basis of his own data.

Moreover, Rai Bahadur R. P. Chanda has pointed out that the typical characters of the Mongolian, for example, straight hair, yellow complexion, slit and oblique eye, epicanthic fold, absence of bodily hair, are not present among the Bengalis. So Risley's con-

clusion seems to be too hasty. Again, Dr. Bhandarkar has shown in his paper on "Foreign Element in Hindu Population," that a similarity can be found in surnames used by the Nagar Brahmans of Guzerat and the Bengalis, as for example Datta, Burman, Mitra, etc. By analysing the data, given by Risley, of these two peoples we see that 73 per cent. of the Nagar Brahmans are brachycephalic and 70 per cent. of the Bengalis are also brachycephalic. So we cannot understand why Risley takes the Scythian element as the cause of the brachycephalic factor in the Bombay presidency and the Mongolian for Bengal. Hence we shall have to trace some non-Mongoloid broad headed people near about India. In fact, Pamirs and Chinese Turkisthan, as gathered from the data of Ujfalvy and Sir Aurel Stein, is peopled by a brachycephalic people who are known as Homo-Alpinus.

Again Sir Aurel Stein has discovered in the Lob-Nor region certain skeletal remains distinctly brachycranial, and from the present day population it should be noted that this region is inhabited by brachycephalic element, for example, Galcha, Tajik, etc. So these people (Homo-Alpinus) might be mainly responsible for the broad headed factor in Bengal as well as in the Bombay Presidency. When the Alpines came to India they found the Upper Gangetic plain occupied by the Aryans, so some of them came to Bengal and others remained in the Bombay Presidency.

In regard to the Dravidian question, it can be said that among the Dravidians we find three factors: Dolicho-Platyrrhine, Dolicho-Mesorrhine, and Dolicho-Leptorrhine.

Dolicho-Platyrrhine is now-a-days known as Pre-Dravidian. Chanda has compared it with the Nishada mentioned in the Puranas. There the Nishada is described as "black like crow, very low statured, short armed, having high cheek bones, low-topped nose, red eyes and copper coloured hair." Dolicho-Meso to leptorrhine are the true Dravidians.

Risley does not mention anything about the Negrito element in the population of India. But the occurrence of Negrito element in some of the Pre-Dravidian tribes cannot be denied. Iyer observes woolly hair among the Kadirs of the Cochin hills. Lapique found near south Indian virgin forests some groups with distinct Negro faces. Their hair is generally curly and in some clearly woolly. Giuffrida-Ruggeri also thinks that among some of the South Indian jungle tribes remnants of the Negritos, who are supposed to have been there from before the Pre-Dravidians, are still to be found. Hutton has recently shown that there is a Negrito substratum in the population of the Eastern Frontiers of India.

CLASSIFICATION OF THE INDIAN PEOPLES

ACCORDING TO EICKSTEDT

Dr. Eickstedt has classified the Indian people both from physical and cultural points of view. He has given four main divisions:—

1. WEDDID or ancient Indian—primitive people of the jungle. It is divided into—

(a) GONDID—Dark brown complexion, curly hair, totemistic, mattock using culture, matriarchal influence.—The oraons, Gonds, Bhils, Juangs etc.

(b) MALID—Hair is curly with black brown colour, originally ancient culture with foreign influence.—The Kurumber, Weddah, etc.

2. MELANIDS OR BLACK INDIANS—mixed group (racially). It is divided into—

(a) SOUTH MELANID—Black people in the most Southern plains of India with strong foreign matriarchy.—Yanadi, etc.

(b) KOLID—Primitive people with black brown complexion of the North Deccan forest, strong totemistic and matriarchal influence.—The Santals, Mundas, the Hos, etc.

3. INDID OR NEW INDIANS—Racially advanced people of the open region. They are divided into—

(a) GRACILE INDID—Brown people with gracile appearance, have enforced patriarchy.—The Bengalis.

(b) NORTH INDID—Light brown people, possibly original patriarchal herdsmanship.—The Rajputs, Todas, etc.

4. PALAE-MONGOLID—Palayan from Wynad.

LANGUAGE

The first thing that strikes us is its wide diversity.

The language of a particular race may show some points by which that very race may be distinguished from others associated with it.

But we know that whenever any migration occurs in any particular country the language adopted by these people differs much from that of the native inhabitants.

It is a matter of fact that when speech is a biological factor it takes up certain lines for the formation of a language. For an English speaking people it will be rather difficult to pronounce all the words in the Bengali language; of course it depends to a certain extent upon the environment.

Again when a particular group of people with particular language passes through a certain country it leaves and takes up certain words to and from the language of those people with whom it came in contact. This however cannot prove that there is a race mixture.

It is a fact, when we look to ourselves, that we Bengalis, who live in the western part of the province can speak Hindi and acquire much of it giving a complicated form in our mother language. But truly we never connect ourselves with them from social side, i.e., marriage etc., producing a race mixture. From this stand point of view it will be rather improper to regard language as a criterion of race distinction.

There is another point to be judged. If an English child is brought up in a Bengali family it learns to speak Bengali as we Bengalis do. But

indeed we cannot regard him as a Bengali.

The main difficulty to take language as a criterion of race distinction is that language is not a biological factor, it is not inherited but acquired.

Again even if there is a race mixture, the descendants may take up only the language of the father or of the mother or a complicated form of both. At this point we are confused to look upon language as a criterion of a race. We can say this much for a mixed language that these two races came in contact. Moreover there is hardly any pure race to-day. With the help of language we can only put them in groups, but cannot classify them with distinct racial elements.

The prevailing languages of India are numerous of which the following five are the main:—

1. AUSTRAL-ASIATIC—Mon-Khmer—Mio, Wa, Palaung; and Munda—Pre-Dravidian.
2. TIBETO BURMAN—Kachin, Tibetan, Lolo, Burmese, Kuki, Naga.
3. DRAVIDIAN—T'elugu, Tamil.
4. ARYAN—Indo-Aryan, Rajput, Galcha, Tajik, Marathi, Bengali etc.
5. UNCLASSIFIED—Andamanese, Gipsy language.

PART II

SOCIAL ANTHROPOLOGY

CHAPTER I

OUTLINES OF SOCIAL ANTHROPOLOGY

IT is rather difficult to define precisely the limits of Sociology as a distinct branch. Ploetz starts with a discussion on this. Strictly speaking Social Anthropology should be restricted to the consideration of the hereditary factors determining the different social groups. But Ploetz recognises the difficulty of a clean cut separation of the hereditary factors from outer environmental influences in Society. According to him Social Anthropology should concern itself with (1) varieties of mankind placed in different social structures; (2) part played by varieties of social functions, i.e. mutual co-operation, etc.; (3) different characteristics of different varieties influenced by a social structure. In one word Ploetz emphasises the ethnic elements in social structure. To English and American scholars roughly speaking Sociology concerns itself with the study of the advanced society, whereas Social Anthropology deals with the society of the primitive peoples. Still as a matter of fact no true

books of Social Anthropology would be found to cover the same ground and approaches to it are as diverse as possible.

The American school tends to study the social aspect of primitive lives emphasising the culture of different human groups. In France there has been two widely divergent schools: (1) Levy Bruhl wants to analyse the primitive people in order to find out the Psychological processes of the less advanced types of mankind, which is described as logical or pre-logical. (2) On the other hand, Durkheim tries to find the basic roots of social progress in the collective life and takes the primitive peoples as illustrations. A fundamentally different approach has been made by the Psycho-analysts. Freud tries to find in the primitive man the symptoms of survivals when compared with the whole of mankind, as he finds in neurotics when compared with individuals. Adler's individual psychology has not been applied to the primitive man. Jung's collective unconsciousness has some direct bearing on the primitive man though it has not been much worked out. The German school tries to analyse society and culture as a series of strata superposed on each other in a given area. Graebnar has thoroughness in the Pacific area where he finds the strata like Tasmanian or Archaic, Old Australian or Boomerang, West Papuan and East African or Totemic, Melanesian, Polynesian or Sudan culture superposed on each other, chronologically each with its distinct material culture and social organisation. The

school of Elliot Smith, Perry and Rivers tries to explain the diverse type of culture and society as due to the migration from some civilization centre, such as Egypt.

The American School of Boas, Wissler etc. tries to confine the studies within one continuous culture area geographically limited, and to find out the historical process of the growth and diffusion of culture traits. Lastly there is the school which has a greater tendency to study the social functions of different institutions and traits. Malinowski and Radin may be regarded as belonging to this school.

Anthropology along with the social sciences studies the objective side of the group and specially the community life of the primitive peoples. The Anthropological unit is conveniently taken as the community by which is meant the local group within a tribe. Anthropologists should first acquaint themselves with some primitive peoples by actual field study.

A COMMUNITY is largely self-defined and is composed of a group of individuals, males and females, children and adults, young and old following the standardised procedure. It has its biological aspect and economic problems of livelihood by means of the available resources.

PRIMITIVE COMMUNITY: The local group varies in size in different tribes. In Australia the local group of the Aruntas is only a loose aggregate of families dwelling in proximity and its constituent members often belong to the same totem. The Andamanese are

often spoken of as one of the most primitive tribes. Biologically they are classed as Negritos, culturally they are hunting people either on the coast or in the island forest. The local group consists on an average from 40—50 persons of all ages, the minimum number of a local group being 10. Amongst the Kharias of Chotanagpur only one or two families might constitute a local community. Amongst the Bunas of Bengal 5 houses have been found to exist at a place to form a group. The Irulas are often found in groups of two or three families in a single place. In Assam there might be 5000—6000 in a primitive village. Amongst the Andamanese the local group is a land owning group. A man might hunt over his own group land at all times but not in the land of another group. The local group has within its territory several camping places, and they are generally semi-nomadic, changing camps with changes of seasons. The forest dwelling Andamanese have generally permanent camps where they spend the rainy season. The Veddahs are wild cave dwellers living in well-portioned caves in the forests of Ceylon. The Andamanese are generally patrilineal and the Veddahs have clan organisation with female descent. In communal caves there is an apportionment of the caves among the different families, each family keeping strictly within its own limits. The food is generally cooked by one man and shared by all members of the community but the food is not the private property. Often men keep their bows and arrows in one place.

The local group or community is thus to be clearly distinguished from the family, the totem group, the tribe and the nation. The primitive community has an average minimum size for each region and there is also an upper limit in size. The size of the tribe may be as small as 150; there might be some with 500 to several thousands. In Assam there are still some tribes whose total population scarcely exceeds 100. On the other hand there are some large tribes with 1,000—1,500. In primitive California the average density is 1—1.4 sq. miles per person. In native Australia it is 18 sq. miles per person. In East Africa there is a high ratio, one per 0.35 sq. m.

CHAPTER II

DEVELOPMENT OF SOCIAL ORGANISATION

To consider the development of social organisation it is necessary to look to the groupings of the earliest people. Groups came into being through functions both individual and social, and the simplest would be the FAMILY. G. D. H. Cole speaks of the institution of the family as almost direct and not a product of social influence. But among no one of the primitive peoples do we find the existence of pure families without any other social groupings, and Rivers says, "the social function of the family assign to each individual born into a society the special place which he or she is to occupy in that society." On the whole the primitive social groupings are best understood by

a comparative study of the like institutions in modern civilized society.

The first is the FAMILY or DOMESTIC group formed of the members related to one another with the concept of "HOME." The second is POLITICAL. Certainly this primitive political group does not perform the complex function of a civilized government and a number of social groups may be combined though very loosely to form one political group. The third is OCCUPATIONAL, connected with the division of social labour. Sometimes it is so slight as to be unrecognisable. The fourth is RELIGIOUS. The specialisation of religious functions is distinctly obvious. The fifth grouping is EDUCATIONAL, though of a very simple kind, some distinction is recognisable. The sixth is the SOCIETY or the CLUB. It is like the modern associations devoted to some common purposes, like games, pursuits of science or arts. The so-called secret societies of the rude people in which knowledge of the purpose and main proceedings is withheld from the rest of the community are important examples.

FAMILY: It may be regarded as the simplest and smallest social group consisting of parents and children. Complications may arise with Polygamy and Polyandry. But if the children by different marriages live together the family will still be a simple one with parents, children, brothers and sisters. Real complication of family is where relations of the husband and wife live together. It may be either unilateral or bilateral. In unilateral cases the relations

may be either paternal or maternal. The modern cases in civilized societies are usually paternal, and is most prevalent in India under the title of Joint family, and there is no doubt that it was also the characteristic of certain societies of northern Europe. Joint family through female relations is to be found among the Khasis and the Nayars of India. The bilateral family where the relations of both the parents come to live together is comparatively rare. The best example is to be found in the western parts of Solomon island. The unilateral joint family resembles considerably the clan, and the Nayars of Malabar are the best example.

CLAN

Clan is an exogamous group, the members of which are held together by a tie of common ancestry, common totem or common territory. According to Wissler common unilateral ancestry is a *Stem*. Common male ancestry is termed *gens*, and common female ancestry is termed *clan*.

TOTEM

Totem is a species of object, animal, plant or inanimate, which the members of a group believe themselves to be related to. The exact nature of the relationship will vary in different groups, but there is often a belief in common ancestry.

Sometimes a totemic group may possess a common territory but this is not usual. A territorial group has been found to consist of people possessing different totems. The territorial bond is an expression of the belief in common descent but patrilineal

or matrilineal totem may bring about the presence of different totems is the same territory. This is called linked totemism as in British New Guinea.

Apart from other social functions of the group the common tie is usually the common property. But in North America and Melanesia common ownership is considerably restricted in the joint family or kindred.

MOIETY

In Melanesia, Australia and North America many communities are divided into distinct divisions called MOIETIES of which the special function is regulation of marriages. In Melanesia and Australia moieties appear to go beyond the limit of the tribes or territorial communities. Moieties regulate marriages but sometimes they are hostile to one another, consequently a father and a son may be found to be hostile to one another. This hostility is connected with the belief in the difference of the physical and mental characters and in the claim of the superiority of these.

TRIBE

"A tribe is a social group of simple kind, the members of which speak a common dialect, have a single government, and act together for such common purpose as warfare." It is usually more or less endogamous. The habitation of a common territory is ascribed to a tribe, but we have nomadic tribes. It is political rather than a domestic group with a common speech as its characteristic. A tribe may be

regarded as the simplest pattern of a modern civilized nation.

MARRIAGE

Marriage is defined as "a relation of one or more men to one or more women which is recognised by custom or law and involves certain rights and duties both in the case of the parties entering the union and in the case of the children born of it." The right of sexual intercourse is always implied in marriage. The society gives allowance to such intercourse in the case of the husband and the wife. Besides the regulated sexual relations, marriage has other factors. It is an economic institution. The husband should maintain his wife and children. Moreover, there are other social and ceremonial aspects of marriage. The performance of the union is to be done according to the rules laid down by custom or law. The consents of the parties and their parents are also required.

Marriage is developed from a primeval habit. If we cast our glance to the primitive society we find that both men and women live together and have sexual relations with one another and maintain their children in common. The men were the protectors and the women were the nurses of their children. In this way natural habit of coupling of one adult man and one adult woman was sanctioned by the customs and laws and formed a social institution. Thus the family evolved out of some primeval habit, possibly from biological nature.

The family as consisting of the parents and their

young children is recognised even in the most primitive society, even by the Veddahs and the Andamanese. Such a specific family unit as Dr. Westermarck has shown, exists even among the anthropoids and among some of the birds. Thus we find that such social tie of the family life is as early as human society, possibly it is still earlier. The binding force of the family tie is embedded in the instinctive life resulting from the biological necessity of preservation of species. It has been much intensified by the addition of various ethical conceptions and finer human sentiments. Hence it is evident that "marriage is rooted in the family rather than family in the marriage." It is possible that the family existed long before the marriage system was in vogue, for the origin of the family was in the biological necessity of preservation of species. The human parents, like gorilla, chimpanzee and some birds, live in pairs, for rearing up of their young ones, forming a distinct unit. The idea that the family originated in the biological necessity is evident from the fact that in the primitive society pre-marital relations are followed by compulsory union when there are symptoms of pregnancy, or really a child is born. In some cases true married life does not begin, though socially married, and the union does not become stable, until a child is born. In conclusion, it can be said that the family at first was a biological unit. This unit later on got the sanction of the society and formed a social institution called marriage.

FORMS OF MARRIAGE

In human society three forms of marriage are found: MONOGAMY—marriage of one man with one woman; POLYGAMY—marriage of one man with several women; POLYANDRY—marriage of several men with one woman. To these a fourth form can be added, viz: GROUP MARRIAGE—when several men marry several women.

The primitive people who have little knowledge of agriculture, and are still in the hunting and food gathering stages, are strictly monogamous. Exceptions can be noticed in the case of some Australian and Bushmen tribes. The Veddahs of Ceylon, Negritos of Philippines, and some of the African pygmies are monogamous. Among the pastoral people monogamy is rarely met with, and if we turn our eyes to the agriculturists we find polygamy becoming more frequent and more generally practised.

Polygamy is at its height in Africa both from the point of frequency and the number of wives. It is said that King Benin had 600 wives and King Mtesa of Uganda had 7,000 wives. In India polygamy prevails everywhere. It is still found among the Kulin Brahmans of Bengal. Among the Bunas of Bengal this practice is prevalent. A Buna can marry as many wives as he can maintain. Among the Koms and the Vaiphei Kukis a man may take any number of wives, though practically a man hardly takes a fourth wife while the other three are alive.

CAUSES OF POLYGAMY: Polygamy becomes natural

in a primitive society when the number of women exceeds that of men. The periodical continence and sexual restrictions a man, having one wife only, is put to, compel him to seek the company of more than one woman. In primitive society a woman during her menstruation, is an object of superstitious fear. During pregnancy the husband must abstain from his wife, for there is a belief that intercourse during pregnancy is harmful to the child in the womb. After child-birth the husband has to remain aloof for some time. All these are obstacles in the way to the satisfaction of a man's sex-craving. The obstacles are removed by introducing polygamy.

Fascination for female youth and beauty is one of the causes of polygamy. In primitive society a woman has to labour hard in the field and besides she has to bear children. These bring in early loss of youthful charms in a woman. So the man feels an inclination to find out a new mate.

Another cause of polygamy is man's taste for variety. Long familiarity dulls sexual instinct, which is usually stimulated by novelty.

The barrenness of a wife or the birth of a female child is one of the reasons for looking for another partner. In the east the desire for a male child is one of the main causes of polygamy. There is a Sanskrit saying, — “पुत्रार्थे क्रियते भाव्या” — one selects a wife only to have a son. The Hindu conception is that a man must have a son who after his

death will perform spiritual rites for the salvation of his soul.

In primitive society to have many children is a source of power, strength, protection etc. For the life of the primitive is always in danger due to constant blood feuds with the neighbours. So to have many children polygamy is introduced. If we cast our glance to the primitive society we will meet with heavy child mortality. To save the tribe from extinction polygamy is necessary. In primitive society to have many daughters, who will be a good source of income through their bride price, polygamy is resorted to. In primitive society a man's material comfort is increased through the labour of his wives. This is also a cause of polygamy. Another cause of polygamy in the primitive society is that the larger the number of wives a man possesses the higher is his position and respect in the society.

POLYANDRY: Polyandry exists among the South American Indians, Eskimos, Nayars, Todas, etc.

Polyandry is of two varieties: (1) Fraternal or adelphic—found in Tibet where husbands are brothers. (2) Non-Fraternal—where the husbands are not brothers. This type is found among the Nayars of South India.

CAUSES OF POLYANDRY—Numerical disproportion between the sexes leads to Polyandry. In many parts of the Himalayan region where Polyandry is in vogue, the women generally are less in number. Polyandry may be a result of high bride-price. Sexual laxity

and freedom of women in primitive society leads to Polyandry. In Tibet the cultivated land is limited and hence the income is also limited. So natural tendency arises in the primitive mind to check the population and this will be done by introducing Polyandry. Economic difficulties form an obstacle in the way of maintaining a family. So a small number of persons jointly marry a common wife. Lowie thinks that Toda Polyandry is due to a former practice of female infanticide. The same opinion also holds good in the case of the Eskimos.

GROUP MARRIAGE: Sometimes it is seen that a number of men are married to a number of women. This sort of marriage is known as Group-marriage. Mr. White writes that in Tibet, Bhutan and Sikkim three brothers can marry three sisters and all the wives are in common. Mc. Lennan and Herbert Muller say that sexual communism prevails in the early stage of society, and group marriage is only one step higher from the promiscuous condition.

ENDOGAMY: Endogamy is a system of marriage in which a man must marry within his social group.

CAUSES: (1) Racial hatred has always been a very prominent cause of endogamy. (2) Racial endogamy is included in racial pride. (3) Dr. Westermarck says that in the beginning there is possibly an instinctive feeling of sexual aversion, resulting from some physio-biological disparity which prevents animals of different species from pairing. (4) Difference of religion has often stood as an

obstacle to marriage between two groups of people.

EXOGAMY: Exogamy is a term employed to designate the rule that a man must select his wife from outside his own group.

ORIGIN: (1) Males desire for variety. (2) One theory traces the custom back to the animals. The head of the herd holds all the females as his own property and the young males have to find their mates outside the herd. (3) Freud says that Society guards against various complexes, especially those between father and daughter and mother and son, by making rules of exogamy. (4) Mc. Lennan supposes that exogamy arose through a scarcity of women caused by female infanticide, which obliged men to steal wives from other groups and so gradually established a prejudice against marriage within the group. (5) Dr. Westernmark holds that exogamy originated in a natural aversion to sexual intercourse between persons who have been brought up together, and that as such persons are commonly blood relations the instinct finally took the form of an aversion to marriage among near kins. Moreover, since marriage with near kin appears to be injurious to the species, the horror of incest may be regarded as due to the growth of intellectual observation.

(6) Prof. Durkheim holds that exogamy originated in a religious respect for blood of the totemic clan, especially for menstruous blood of women which prevents men from having any sexual relations with them.

(7) Havelock Ellis says that familiarity brings contempt destroying sexual appetite and sexual attractiveness.

(8) L. H. Morgan holds that exogamy was introduced to prevent the marriage or cohabitation of blood relations, especially of brothers and sisters, which had been common in a preceding state of sexual promiscuity. His view is supported by Howitt, Fissons, Spencer and Gillen.

Lastly, Frazer says that the principles of exogamy present a curious resemblance to the principle of scientific breeding.

VARIOUS WAYS OF GETTING A WIFE

MARRIAGE BY CAPTURE: Among the primitive communities of the whole world this sort of marriage was in vogue. This is a kind of marriage, the woman is taken away forcibly without her own consent and that of her relatives. In Terra del Fuego this system of marriage occurs among the Yahgans and Onas. When the Onas make a raid on a neighbouring tribe, they kill the men and marry their women. Among the Chukchees of Siberia marriage by capture was very frequent in the past. Among the Bhuiyas of Orissa if a youngman is in love with a girl and either she or her guardians will not give consent to the marriage, the youngman, with the help of his friends will carry off the girl at a suitable opportunity. The Hos of Bengal also practise this marriage by capture.

MARRIAGE BY PURCHASE: "The older school of writers thought that wife capture gave way in time to

wife purchase." Spencer considered that "Purchase is the usual substitute for violence as civilization progresses." 'We find that in Vedic age marriage by purchase was in vogue. An illustration can be cited from Mahabharata, *King Pandu gave the king of Madra gold and other precious metals, elephants, horses etc. to have his sister. Nowadays among some of the lower castes of Bengal marriage by purchase is practised. The Vaiphei Kukis of Manipur also observe this practice.

MARRIAGE BY EXCHANGE: 'This sort of marriage is a modified form of marriage by purchase in which the bride price is compensated by an offer of a girl in return. This practice is found among the Bhatias of Almora.

MARRIAGE BY SERVICE: Tozzer says, "Marriage by service is so common in Hebrew tradition that it is another name for compensation." The bridegroom lives with his father-in-law and works for him for a certain period of time to gain his daughter as a wife. The period of time varies in different groups of people. This system is practised by the Bunas of Bengal. The bridegroom lives in his father-in-law's house and serves him for 6 to 9 months to gain his daughter as wife. Among the Vaiphei Kukis this period is extended from 2 to 3 years. This practice is also found among the Eskimos, Ainus of Japan, etc.

LEVIRATE: a sort of marriage in which one marries the elder brother's widow. If brothers live together and one of them dies childless, the wife of the deceased

should marry one of his brothers. The first born issue succeeds in the name of the deceased. This custom was a Hebrew one.

There are two forms of levirate: (1) When the husband is the younger brother of the deceased it is known as JUNIOR LEVIRATE. (2) When the husband is the elder brother or elder kindred it is SENIOR LEVIRATE. Among the Bhumijas of Orissa, Hos of Seraikella, Bunas of Bengal, Kirgiz, Panians and Parayans, etc., this custom still prevails.

SORORATE is defined as a marital alliance in which "several sisters in a family are regarded as the wives of the man who marries the eldest of them." The typical example of sororate is found in Rockchild of N. America.

CROSS-COUSIN MARRIAGE is a marriage between the children of brothers and sisters. There are two varieties: (1) Mother's brother's daughter (M.B.D.), (2) Father's Sister's daughter (F.S.D.). It is found among Mikirs of Assam, Vaiphei Kukis, Todas, Bihors, Veddah, Hottentots, Herero of Africa, etc.

PARALLEL COUSIN MARRIAGE is a marriage between the children of two brothers or two sisters irrespective of the rules of descent.

CHAPTER III

PRIMITIVE ECONOMIC LIFE

ECONOMICS deals with production, distribution and consumption of wealth. In the primitive society this wealth would naturally mean nothing but supply of food. And the fact remains that the distribution

of animals has followed food supply. Man or animal has always moved to the place of the easiest source of food supply. So long as man would depend on mere collection of food, this movement from time to time would be an inevitable and unavoidable part of social culture. With increase of social complexities and difficulties of movement, or with intellectual observation, man will begin to take to food growing. This in its turn would further increase social complexities and give rise to cultural aspect of human industry. Thus we may arrange the economic life of man in the following order:—

1. Food collectors — hunting tribes.
2. Pastoral life — people domesticating animals, herdsmen.
3. Agriculturists — Non-nomadic people with settled abodes.

Absolutely pure form of any one of these stages could scarcely be found, as man passed from the simple hunting stage through the increasingly complex stages. But it cannot be denied that food has considerably influenced grouping of men or formation and growth of social life. Thus in the different stages there have always been some changes in the social relationship between man and woman, young and old. Choice and capacity of the sexes, and of the aged and the young, also contributed much to the adjustment and readjustment of social relationship, rank and position.

On the otherhand, the question of the ownership of food, gathered or produced, gives us an idea of a crude sense of property amongst the most primitive people. This gives an idea of the development of intellectual outlook growing an anxiety for future provision, which again is an important factor in the development of social and economic culture. Thus stage by stage we may observe, man collecting food from the forests and wilds, and living on the raw meat of the beasts, hunted without the help of any definitely manufactured weapons, or on the grubs or worms or all sorts of the most easily available trash. In the next stage he uses the crudest forms of stone implements and forms groups for better collection of food. He moves away from the place where food becomes scarce. The gradual scarcity of food at a place makes him anxious for storing food. He learns to domesticate animals both as aids to hunting and for the purpose of food supply. Then he observes the growth of plants from seeds and learns to sow seeds. He makes rude implements of stone, of bronze or of iron to till the soil, and sow seed. This gives him a permanent supply of food at one particular place. His nomadic habit decreases, he settles down and begins to grow immense complexities in social life and culture. However it is to be noted that all these stages cannot with exact precision be found in every people. Circumstances, environment, and accidental discoveries or inventions, like that of metals etc., may give a people a leap over a number of stages.

1. FOOD COLLECTORS—HUNTING AND FISHING TRIBES

Primitive peoples living on hunting and fishing gradually developed various methods for their food collection. A survey of these will prove that they depended mainly on conditions of local life. The hunting methods may be enumerated as baiting, stalking, enticing, snaring, setting of traps or using poisons etc. The fishing appliances are mainly hooks, nets, and traps of various shapes and sizes. This most primitive stratum can still be found amongst some people. As development of the methods of hunting or fishing is a mark of culture, it is to be noticed that cultural differences largely depended on and were determined by local peculiarities of climate, flora and fauna. Thus in the northernmost area with arctic and subarctic climatic conditions the caribou (Reindeer) is the principal food of the primitive people. The Eskimos and the Canadian Indians live in the tract—the former mainly depending on seals and caribou, and the latter on the reindeer alone. Their whole fooding and clothing centre round this animal. South of this area the bison was hunted by buffalo. In South America a kind of wild Llama called Guanaco was hunted with the bola and the bow. Further south the Patagonians lived mostly on seals. The animal food in the north was supplemented by perry-edible roots, and in the south, by the nuts of a type of pine tree and seeds of another type of tree. In the north-west Pacific area the main food supply was salmon.

These fishing people also preserved a kind of fish in a pulverised form and several pieces of roots were also eaten. In the Californian area the chief food was acorn made into a kind of bread or cakes. In the centre of the American region there was the area of intensive agriculture, principally of maize. In Palaeolithic times the inhabited part of Europe was a hunting area, probably the conditions now surviving in central parts of Siberia. In Australia hunting was the chief occupation, and in the Pacific region crude agriculture and domestication of chicks and chickens were the basis of life.

The Andamanese, the Veddahs of Ceylon and the Bushmen of South Africa may be taken as the typical examples of the hunting people. Living in the anti-desert with alternate dry and rainy season and scarcity of water, the struggle for existence for the Bushmen is very hard. The animal life includes the elephant, lion, leopard, hyena, jackal, and a type of zebra and various smaller animals, such as rabbits etc. and ostriches and other birds. These are generally hunted by means of pitfall traps and disguises (They sometimes hunt disguised as ostriches. In Bengal there is a class of nomadic people called "Hagharis" who hunt jackals by imitating their cries) and the efficient hunter becomes the leader of the tribe and families adhere to him. The bow and the poisoned arrow are the chief weapons. Hunting is the work of men while women supplement the food by digging roots and collecting berries. The digging stick

is the most useful implement for this. Insects and wild beasts and eggs, large white ants are also eaten. Water is carried in ostriches' eggs or melons. Knives of stones are used for dressing the skin, in the preparation of clothes and ornaments. They build bee-hive-shaped huts for dwelling. The man is busy during the whole day with hunting, and women and children live on whatever they collect. There are no methods of preserving food etc.

In order to consider the economic life of the hunting tribes it is needful to cast a glance over some factors influencing the life of the peoples with primitive technique.

Their communities are generally very small, varying between 12 and 50 heads. A community consists of a number of small families—a family consists of a mother and children protected by a man. The men do the heavy and laborious works of hunting while the women help them as collectors.

Among these hunters specially who live in deserts and steppes, the whole community moves from time to time according to the movements of the game, the ripening of the wild fruits and other produce, and fishing seasons.

Inter communal help in good and bad times also contributes to a great deal to the economic arrangement of the communities of the hunters (e.g. small Eskimo communities).

2. HERDSMEN

The stage when a hunting tribe begins to confine

itself to one particular kind of game (e.g. North American Indians followed the herds of bisons from one place to another) is the first in the transition to a nomadic life combined with herding. In comparison with the true hunters such nomads are more or less certain of their subsistence and their community is as a matter of fact more closely intertwined. The herds constitute a permanent possession and, in some cases, are a gradually increasing wealth.

There are two main types of pastoral life—(1) Nomadic type (no fixed abode). The pastoral peoples seldom remain in one spot for a pretty long period, as a frequent change of habitation is necessary for the health of the animals. (2) Sedentary type (with grazing ground and variable amount of associated agriculture). The people usually depend on other foods than that provided by their herds.

In tracing the history of the pastoral tribes we should know what an important part in shaping social organisation is played by the domestication of animals. The importance of animals varies according to their kind, whether they provide food, clothes, or labour-saving devices. In consequences of these differences as well as of other local influential factors (e.g. ethnic element, climatic conditions, and physical features of the place) the domestication of animals developed on different lines in different places. The use of animals as food may be considered as the oldest form of economic use which was probably followed by

further attempts to use them as draught animals, beasts of burden, and only later, for riding or for the sake of their milk and wool.

The sense of dependence on the animals and their produce (i.e., milk, fat, meat etc.) induces a special religious conception, a particular respect for the higher powers. As a consequence of this a number of rites and ceremonies is practised for the care of animals, their pasture and everything concerned with them. The social status of a family group depends on the number of cattle in its possession.

Animal milk plays a great part in supplying nutritious food for the rearing of the infants. This fact has engaged the attention even of uncivilised people, because greater proportional increase in the population of such communities is a vitally important factor. A number of ceremonies is connected with milking, drinking of milk, its distribution, milk sacrifices, the form of the milk-containers and the mode of cleaning and preserving them. Milking is done under the protection of a charm and that by man. The care of the milk vessels and of such milk as is not necessary for immediate consumption is the woman's duty. Indian legends tell us that milking was done by the girls of the family.

3. AGRICULTURISTS

Man even while he gets his food as the lower animals do, by collecting wild fruits and procuring games and fish, feels inclined by virtue of his higher intellect, to get these more easily by artificial means.

In order to understand the gradual development of these artificial means it should be borne in mind that agriculture is not a difficult or out-of-the-way invention. Even the most uncivilised people, skilled as he is in the gathering of the food plants he lives upon, must know well enough that seeds or roots put in a suitable place in the ground grow and thrive. Thus the savage people when they settle in one spot all the year round, and the local geographical conditions, i.e., climate and soil, are favourable, mostly plant a little (e.g., the Indians of Brazil) and get a supply of food.

There exist different methods in the tillage of the soil among different peoples, and consequently social and religious organisations are equally varied. Among the Australians we find the pointed digging stick to procure eatable roots etc. The Nagas and the Kukis of the north eastern part of India use hoe as their implement for cultivation. The plough is used as an agricultural implement by the Santals of the Santal Parganas and other people of the plains, to cultivate larger areas of land. All these implements are used mainly by men, and women help them in the field in various other ways, i.e., supplying food to them during their work, sowing seeds and reaping the harvests. The social life of these people has become much more complex. They have their abodes fixed. They know the art of storing food articles for future provisions. Thus they have ample opportunities of developing cultural aspects, and we find in them a fuller sense of property.

CHAPTER IV
PRIMITIVE RELIGIOUS IDEAS
ANCESTOR WORSHIP

Herbert Spencer develops the theory of ghost worship by dealing elaborately with the primitive idea of life, death, resurrection, soul, spirit, the other world and the cult of the "ghost." Spencer finds that some notion of existence beyond death, however vague, is almost universal. As the idea develops, it takes a definite form and the mind thinks out something in imitation of the realities of the world but vastly superior in power and moving about without actual earthly bodies as spirit or ghost. From this belief comes the idea of ghost propitiation, not only at the time of funeral but also on later occasions. From this the idea of regular ancestor worship originates. The ancestor may be the father of the family, but among the primitives we find, that the father worshipped is generally the first tribal ancestor. It may be hero worship; the hero should be a tribal hero, real or mythical or some leader of a conquering race. From these Spencer concludes that "Ancestor worship is the root of every religion," and all other forms, such as idol worship, fetish worship, animal, plant and nature worship, develop out of ancestor worship. This theory is based on the following grounds:—

1. We see that in every case there is a human personality behind the supernatural being.
2. If anything appears to be superior to the ordinary things of life, the primitive people regard that as

supernatural or divine. Thus a chief is favoured for strength; a medicine man, for his skill in curing diseases; a victor, for his conquests; and all assume divine aspects. Such persons are held in awe during life time and with a greater awe after death. This leads to the propitiation of their ghosts, and results in an established form of worship.

Ancestors may be of different forms:—

1. In primitive culture we find the ancestor is represented by the Supreme Being. This Supreme Being has neither wife nor family. This form of ancestry is found among the pygmies of central Africa, some Australians, natives of California, etc.
2. In the boomerang culture in Australia and Africa the conception of the ancestor is somewhat different. Here we find a single figure, the first father. He is the first mortal, risen from the dead and is often equated with the moon. He may also be symbolised by other lunar animals such as hares, snakes, rabbits etc. At the initiation ceremony He appears in these forms and is much dreaded by the initiates. The first father is not subordinate to the Supreme Being but has already coalesced with him into a single existence.
3. If we look into the higher society we find that the first father no longer receives worship, but a number of dead ancestors. Among the Mongolians, Turkish nomads, etc., we find that

the father of the race has acquired the same cult as the Supreme Being. But in this case he is not always the symbol of virtues, and may sometimes represent vice—the devil.

4. Ancestor worship may take the form of totemism. It is found in Australia, New Guinea, India, Africa and America.
5. In exogamous matrilineal culture instead of the father, the tribal mother is identified with the moon or with the mother earth. The ancestor worship takes the form of worshipping the mother earth. Side by side with this mother cult we find secret societies among the noble members of the community for the worship of the ghost, especially in the form of skull worship, which is really a cult of worshipping the spirit of the individual ancestor.

Among the Indians, Iranians, Chinese, Japanese, many European peoples and Polynesians, ancestor worship exists in all the forms.

ANIMISM

It was Tylor who gave currency to the word and made it technical in anthropology.

“Animism is the belief in spiritual beings.” It is made up of two parts: first, concerning the souls of individuals capable of continued existence after death; second, concerning other spirits, superior to man and up to the rank of powerful deities. Animism in its full development includes the belief in the existence of bodiless souls capable of controlling deities and

subordinate spirits. This doctrine of souls is prevalent amongst the lower races and is the result of their mental efforts to find an explanation of the difference between the living and the dead and of the visions and dreams. The belief in an apparitional soul or ghost is that it is a thin unsubstantial animal image in its nature, a sort of vapour film or shadow which is animated independently by the life and thought of the individual and possesses the personal consciousness and volition of its corporeal owner, past or present, and is capable of leaving the body and appearing to men as a Phantasm.

Tylor makes animism as broad based as possible as it has in it the basis of philosophy and religion of man of all times. In Lowie's language, animism is the primitive concept of spirit. The examples cited from primitive life show that the variety of animistic ideas amongst some (Jagga—Bantu people of Africa) is but a belief in disembodied soul of the dead; amongst the Andamanese it is the double reflection or shadow of a living man; amongst the Red Indians (Shoshoni) the belief centres round the life principle, residing on the head and about ten inches long, identical with the "*Angustha Proman Poorusha*" which was taken out of the dead Satyabana by Yama in the story of Savitri in the Mahabharata. It has similarity to the Indian conception of "*Chhaya Sharir*" into which astral state one is transformed after death and is suspended in empty space without any support. In New Guinea amongst the Tami there is a right hand

soul as well as a left hand one. There is also a belief in quadruple souls among some tribes, such as Ye-uchi and Dakota. The Khonds of India have a belief in quadruple souls. In the Hindu Society also we find animistic belief. One good example is their setting up lights on the tops of long bamboo poles in the month of Kartic (Oct. and Nov.) to light the spirits of our fore-fathers to Heaven through the dark regions of chaos.

According to Tylor animism originated in the attempt of the primitive man to explain dreams and visions, leading to his formation of the idea of the independent ethereal existence of the soul. But Durkheim objects to it on the ground that the complete dissociation of the soul from the body is not to be found in the primitive belief in all its aspects. Sometimes a part of the body is not only regarded as the seat of the soul but is identified with it. Moreover, the primitive man's attempt to explain dreams is a point which goes against his having formed an idea of the reality of dreams. Finally Durkheim says that if religion had been based on dream and hallucination, as Tylor thinks, it could not have survived thousands of years. Objections have come from another quarter; the Elliot Smith Perry School, which traces the origin of everything including animistic belief to Egypt. It is not accepted by all anthropologists.

Tylor's scheme of religious evolution that animism is the basis and the model on which all the religious ideas of soul, demons, deities etc. were gradually built

up, culminating in the great conception of one Supreme Spirit, is also liable to objections. Tylor, like his contemporary Mid-Victorians, was fond of an evolutionary scheme of things in a single line and applied it to religion. He has been challenged by anthropologists like Andrew Lang to show that the belief in primeval eternal beings exists among some of the primitive tribes. Recently Pater Schmidt of Vienna has shown that the High God concept is present amongst Bushmen, Andamanese, Semangs, Congo Pygmies, etc., who are in the primary culture strata. This High God is eternal, omnipotent and founder of moral laws and is not worshipped in temples or through images. We can no longer hold that religious conception passed through a scheme of pre-animism, animism, naturism, polytheism and monotheism. There is a conception of one Supreme God, and this conception is either independent of or earlier than animistic belief.

TOTEMISM

The word totemism is derived from an American Indian word 'totem,' roughly standing for the tribe.

"A totem is a class of material objects which a savage regards with superstitious respect, believing that there exists between him and every member of the class an intimate and altogether special relation."

Goldenwiser defines: "One speaks of totemism when a tribe comprises a social organisation mostly of the clan or gentile pattern, as well as a peculiar form of super-naturalism, consisting in the most

typical cases of certain attitudes towards species of animals, plants or classes of natural objects."

The characteristics of a totem:—

1. Attitude towards the totem.
2. Relation between the totem and the totemite.
3. Psychic traits common between the totem and the totemite.
4. Some sorts of physical traits common between the totem and the totemite.
5. Representation of the totem as a figure of art or a symbol of sacredness.
6. Taboos in connection with the totem.
7. Groups named after the name of the totem.
8. There is often a sociological aspect of totemism—Exogamy. This is wide-spread but not universal.

Common features of totemism in India:—

1. Clan organisation with totemic names.
2. Concept of taboo.
3. Idea of descent is absent but some sort of relation between the totem and the totemite exists and there are also stories to explain such relations.

In North America the artistic side of totemism is developed. There is a belief in guardian spirit. The members of the totem clan often call themselves by the name of their totems. In Africa no artistic designs of the totem and no clan names are found. The peculiarity is the totemic taboo, the prohibition to eat or kill the totem animal. In Bantu language the

word totem means taboo. In Australia the totemic names and the totemic taboos are universal. There is a close relation between the totem and the totemite, generally a relation of descent from the totem. The totemic symbols are current all throughout the continent. The Mundas and the Oraons of Chotanagpur do not kill the totem animal. The Bunas of Bengal also do not kill and eat totem animals.

ORIGIN: Frazer gives several suggestions for the origin of totemism. According to him a primitive tribe was divided into several totem groups. Each of which was charged with control and superintendence of some department of nature from which it took its name. Thus totemism would be a practical system for regulating the food supply of a tribe. Each totem clan would look after the supply of its totem animal or plants for the consumption of the rest of the tribe. Later on the group totems might have begun with the individual totem. According to Andrew Lang the habit of applying nick-names of animals or plants to individuals developed into the names of the tribes who were descended from them. There are totems associated with a particular sex which is different from the clan totem. These sex totems found in Australia might have developed later on into group totems. Amongst the American Indians the guardian spirit conception is more prominent and the totem might have been merely an individual or tribal guardian or some heroic ancestor. Frazer's view point is to hold totemism as essentially a primitive type of social organisation and

religious belief which developed in very crude surroundings out of more or less magical ideas for the protection of societies.

Freud sees in totemism a profound corroboration of his own hypothesis of the horror of incest and repression, and the sense of rivalry felt by children towards their father. According to him in the primeval horde sons used to kill their father and made a feast of it. The totem is but a substitute of this original patricidal ceremony.

According to Durkheim totemism like all other elementary religious ideas was an idealisation of a group mentality participating in group rites transcending individual feelings for the time being. Thus, it is a symbolisation of group.

Totemism is not an universal phenomenon. Thus it is not a stage through which all mankind necessarily passes, nor are its various functions the same among different peoples in widely different areas. It is very hard to think of totemism as one system spreading culturally from some common centre and diffusing over the different areas. Different causes might have resulted in the similar phenomenon of totemism. Nor is totemism the most primitive system. There are many tribes with the most primitive cultures who have no trace of totemic organisation. Thus totemism may be a later complex system evolving in different areas from different convergent causes.

TOTEMISM—A FORM OF RELIGION: According to Robertson Smith totemism is essentially a form of

religion. He confuses totemism with nature worship and finds totemic belief in the worship of stars, stones, moon, trees etc. He considers totemism to be the starting point of all religions. He further maintains that the sacrifices for the religious rites among the Semites are of totemic nature. He says that the victim was the totemic animal of the same blood and same genus as the God to whom the sacrifice was made, and as the man who did it. Generally it was seen that this animal might not be eaten or killed. But on festive occasions all people of the tribe gathered and killed the totem animal which was identical with God and made a feast on it.

TOTEMISM AS THE EARLIEST FORM OF RELIGION : Totem is a badge of a group. The artistic representation of the totem is very common among the north American Indians. In Australia though such artistic representation is less developed, it is not unknown. On ceremonial occasions the totemic object is painted upon the body of the totemites. Sometimes these totemic figures are drawn upon the ground over a grave. The lines on the *churinga* axe are said to be emblematic of the totem objects. But one remarkable thing is noticed. The totem is not generally painted on the body of the totemite but when on religious occasions the entire tribe comes to live a common social life, the clan members are separated by a division caused by the emblematic figures on their bodies. Thus the totem is a collect label, and it is also a sign of the sacred and profane. Hence the material world

is divided into the sacred and the profane. Thus we find that the most sacred thing of the Australians is the *churinga* which bears totemic emblems. From the above evidence Durkheim draws a conclusion that sacredness is derived from the sacred objects like *churinga*, and from the totemic sign the religious significance is derived.

The primitive life of the Australian aborigines is divided into 2 distinct periods: (1) Dull and (2) Super excitation. During the social ceremonies every individual is exalted and animated by the impulse of the communal life, and the social force becomes apparent to him. The mystic religious ideas and feelings fall upon him in such atmospheric conditions. He then feels a difference between his ordinary life and life on such occasions. Thus the idea of profane and sacred originates. Hence Durkheim concludes that the earliest form of religion is Totemism.

The theory of Durkheim is opposed by Pater Schmidt. Durkheim took the Central Australian Arunta people as the most primitive. But in comparison with the Bushmen, the Andamanese and even the South East Australians, the Arunta people is not primitive but rather advanced. They have no trace of totemism. Thus according to Schmidt the earliest form of religion is not totemism, but High God.

BELIEF IN SUPREME BEING

According to the historical school the human cultures are grouped in four different ways:

I. PRIMITIVE CULTURES, Food gatherers:
 (a) Central primitive culture (exogamous with monogamy). (b) Southern primitive culture (exogamous with sex-totem). (c) Arctic primitive culture (exogamous, equal rights). (d) Boomerang cultures.

DISTRIBUTION: Pygmies of Africa and Asia, peoples of South Africa and of the Nile, Bushmen, South Eastern Australians, peoples of New Guinea, Terra del Feugians, Eskimos etc.

II. PRIMARY CULTURES, Food producers:
 (a) Higher stage of Hunting (Exogamous, totemic, patrilineal). (b) Horticulture (exogamous, matrilineal). (c) Pastoral nomads (Patrilineal with undivided Family).

DISTRIBUTION: Ural-Altaics, Indo-Europeans, Hamito-Semites, Central Australians, Melanesians and Indonesians.

III. SECONDARY CULTURES (Hoe Cultures):
 (a) Free Patrilineal cultures found in Polynesia, Western Asia and Sudan. (b) Free matrilineal cultures found in Southern China, Farther India, Melanesia, and South America.

IV. TERTIARY CULTURES (Plough and Agriculture): oldest civilisations of Asia, Europe and America.

The primitive people live in the primitive stage of culture. This we can understand from the following facts:—

1. GEOGRAPHICAL REASONS: The primitive people occupy the peripheral regions of the earth or

isolated areas such as forests or mountains or other inaccessible places that are least attractive to the people of higher cultures. Thus if we cast our glance over Asia for consideration we find that the people of the primitive culture have occupied the peripheral regions. On the extreme south we find the Andamanese, the Semangs and the Veddahs of Ceylon, etc.; and on the north Kamchadale, Koryak, Chukchee and other tribes of this pattern, who have taken shelter in the extreme peripheral regions being driven by the advanced pastoral and agricultural peoples of Central Asia.

2. **ECONOMIC CONDITIONS:** The people of the peripheral regions are at the lowest stage of economic development. They are mere food gatherers. They have no knowledge of production either by cattle-breeding or by tilling the soil.
3. **MATERIAL CULTURES AND SOCIAL ORGANISATION:** Their material culture is backward. It is evident from their housing and clothing, and their method of preparing tools and weapons. Among them the family is an independent social unit. So their social organisation is loose and simple and mainly confined to family unit.
4. **NEGATIVE PROOF:** These primitive cultures do not show any signs of primary or secondary cultures. If in any case any trait of a primary culture is noticed in a primitive culture we can

say that it is an intrusive element. In primitive cultures we do not find any trace of totemism, agriculture, mother right, cattle breeding etc.

SUPREME BEING IN THE PRIMITIVE CULTURES: Following the facts of the historical school Pater Schmidt at first finds out the primitive cultures of the different parts of the Earth. He applies the geographical, economic and social reasons for proving primitiveness of a culture. He then finds out how the idea of a Supreme Being spread in the primitive culture strata. Schmidt says that to trace the origin of religion the study of primitive cultures is of great importance for the following reasons: (a) Primitive cultures are nearest to the origin. (b) They have preserved in a more or less pure way the archaic form of religion. (c) Being placed in the peripheral or inaccessible places they are not likely to be mixed up with other forms. (d) On account of their primitive character it may be taken that they have passed no culture strata. So by a study of these primitive forms of religion we may have a survey of the earliest form of human religion.

SUPREME BEING IDEA IN THE PRIMITIVE CULTURES: Among the pygmies of Asia and Africa the idea of the Supreme Being is present. The same idea is current among the Boni Negrillos of the forests of Africa, Batwa, Bambute, etc. If we turn our eyes to the Arctic region we find that the belief in a Supreme Being is found among the various Palae-

arctic tribes—Samoyeds, Koryaks, Kamchadales. It is also found among the Eskimos and the Ainus who undoubtedly form a very archaic stage of culture. In America the belief in a Supreme Being is current among the primitive tribes. It is met with among the Ojibwas, Foxes, Sacotas, Algonkins, etc.

From the above it is evident that the belief in a Supreme Being is widely distributed throughout the whole world among the primitive tribes of peripheral regions. From this Schmidt concludes that the belief in a Supreme Being is the essential factor of the most primitive human cultures. He also says that the idea is an archaic one from the fact that the idea of Supreme Being is definite in the primitive cultures, but it is not so in higher cultures. So it cannot be a later development and must be the earliest form of religion.

IS THE PRIMITIVE RELIGION OF A HIGH-GOD OR SUPREME BEING A TRUE MONOTHEISM?—Pater Schmidst says that the Supreme Being is the God of true monotheism and the belief in a Supreme God is a monotheistic doctrine. This theory has been criticised by some authors. They think that the multiplicity of gods is the primitive form of religion. This is known as POLYTHEISM. The Polytheists put forth some views against the doctrine of the Supreme Being (Monotheism), such as:—

1. The Arctic primitive peoples have a Divine Being. He protects the beasts and supplies the chief food of the people. Schmidt here says that this Divine Being is none but the Supreme

Being who exerts his influence over the sky, earth, air, water and hence over the whole of the earth.

2. The belief in the First Father and First Mother is present in some primitive cultures. The First Father in some cases is identified with the Supreme Being and may be associated with the solar myth. This is an indication of the plurality of gods: the First Father, the First Mother and the Supreme Being.
3. In North America and in the Arctic areas the primitive people believe in a creator of evils besides the Supreme Being. This gives us an idea of the multiplicity of gods.
4. In some places the primitive peoples associate the Supreme Being with a wife and children.

Schmidt says against the above facts that many peoples of the primitive cultures do not believe in a wife and children of the Supreme Being. The belief in a wife and children of the Supreme Being as is found among the Bushmen, Southern Andamanese, Semangs, etc. are said to be a later development. Lastly Schmidt says that if we analyse the ideas of multiple gods, a basic idea of the monotheistic doctrine will be found among them. In Schmidt's opinion the other Divine Beings are definitely subordinate to the Supreme God and sometimes there runs a belief that they are created by Him. From these it is evident that the idea of the plurality of gods among some of

the primitives is a side issue and consequently a subsequent development.

FORM AND SHAPE OF THE SUPREME BEING: The Supreme Being cannot be seen nor can He be perceived by human sense organs. His form is human though some remarkable additions are necessary to complete his shape and satisfy the fancy of ascribing superiority to Him. The Andamanese and Negrillos of Africa tell about the invisibility of their god. The Andamanese and the Semangs think that the Supreme Being is often conceived of as an old man with a long beard. Sometimes the Supreme Being is conceived of as shining like the sun or the fire and none in the world can see his face. This belief is current among the Southern Andamanese and the Californians.

NAME OF THE SUPREME BEING: (1) FATHER—In some primitive culture areas the name 'father' is given to the Supreme Being as is found among the Bushmen and the Semangs. (2) CREATOR—The Ainus and the Samoyeds call the Supreme Being 'the creator.' (3) PLACE OF ABODE (sky myth)—The Samoyeds have given the name 'Sky myth' to the Supreme Being. (4) ATTRIBUTES—A few names referring to the attributes of the Supreme Being, 'the oldman,' 'the protector' and 'the giver,' etc., are given by the Ainus and the Eskimos.

HABITATION OF THE SUPREME BEING: I. Among some of the primitive peoples such as Southern Andamanese, Semangs, South East Australians, there is a belief that the Supreme Being originally lived

with them on the earth. But later on being offended by some sinful acts of man he went away to live in the sky.

II. He is often believed as living in the sky, the thunder being conceived of as his weapon. Such belief is current among the Bushmen and the Semangs.

III. Sometimes it is found that the Supreme Being is connected with rain as a source of fruitful fertility in the living world. This idea still exists among the pygmies of central Africa (Negrillo people) and the Bushmen.

IV. The primitive mind believes that the Supreme Being is often connected with the material sky, but he is never identified with it, and is always conceived of as an independent and separate personality.

ATTRIBUTES OF THE SUPREME BEING: There are eight attributes of the Supreme Being:—

1. ETERNITY: A sort of eternity is generally attributed to the Supreme Being. This is found among the Andamanese and the Semangs.
2. OMNIPOTENCE: The Semangs and South Eastern Australians believe that the Supreme Being possesses enormous and limitless power.
3. OMNISCIENCE: It is one of the attributes of the Supreme Being. He supervises the right and the wrong actions of the human beings.
4. BENEFICENCE: There is a wide-spread belief in the primitive world that the Supreme Being

is altogether good. The goodness that men enjoy comes from Him only. Such belief is very strong in the minds of the Algonkins.

5. **CREATIVE POWER:** The pygmy tribes, the Ainus, the Andamanese, Semangs, etc., believe that the Supreme Being is the creator of all things of the earth. Among the South Eastern Australians there is a belief that man is made of clay material and the Supreme Being has given him life through the nose.
6. **MORALITY:** The Supreme Being is morally a good one. This idea is very wide-spread amongst the Samoyeds, the Ainus and the Californians.
7. **GIVER OF MORAL CODES:** The primitive minds believe that the Supreme Being is often ethically good and is the author of moral codes. This belief is current amongst the pygmy peoples, the Samoyeds, the Ainus, and the Californians.
8. **MORAL GUARDIAN:** The Supreme Being is also the guardian of the moral laws, and upholds his laws by giving rewards for the morally good actions and punishing the morally bad ones. Some believe that in the eyes of the Supreme Being there is a demarcating line between the good and the bad actions.

WORSHIP OF THE SUPREME BEING:—

I. **PRAYER:** (a) Mute prayer—A sort of prayer (petition) not to be uttered but expressed by body movements. This sort of mute prayer is found among the Eskimos and the Bushmen etc. (b) Spontaneous

prayer—Prayer expressed in language without any regular hymns (mantras), but speeches come out spontaneously. This is found among the Negritos and the Terra del Feugians, etc. .(c) A third kind of prayer is not petitionary, but giving thanks to the Supreme Being.

II. SACRIFICE: (a) Among the Australians, primitive Californians and some tribes of Africa, there is a sacrifice of leaves and feather sticks. (b) The hunting and the plant gathering peoples offer the first fruits to the Supreme Being. This idea is found among the pygmy peoples and the people of the Arctic cultures. (c) Praying for the pardon of one's sins. As a Kari takes a bamboo knife, cuts with it at his knee and mixes the wound blood with water and throws the mixture to the sky (upward directions) praying for the pardon of his sinful actions.

III. FORMAL CEREMONIES: (a) Initiation ceremony—Some primitive tribes believe that the Supreme Being teaches the laws of morality and religion. (b) Ritual: A sacramental commemoration is found among the Algonkins and Central Californians. (c) Miscellaneous: Among some primitive people are found regular periodic prayers, annual sacrifices and ceremonial functions for rains, etc.

PART III

PRACTICAL

ANTHROPOMETRY is defined as the conventional art or system of measuring the human body.

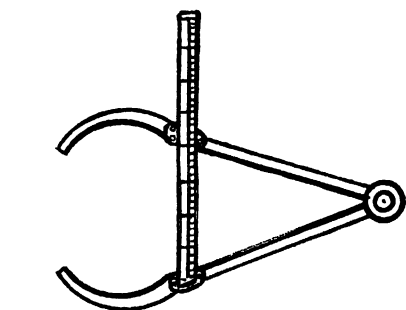
The object of anthropometry is to supplement visual observation, which is always more or less limited and uncertain, by accurate mechanical determinations. The main function of anthropometry is the complete elimination of personal bias and the furnishing of correct data on such dimensions of the body as is of importance.

The measurements of the human body are done for :—

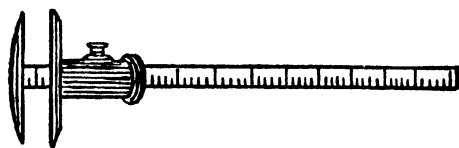
- (a) Military selection.
- (b) Industrial purposes.
- (c) Detection of bodily defects and their correlations.
- (d) Eugenic purposes.
- (e) Cranial investigations.
- (f) Medical or surgical purposes.
- (g) Scientific investigations.

But we are mainly concerned with scientific investigations and the detection of bodily defects and their correlations in gymnastic purposes for the discrimination and the investigation of races and their peculiarities.

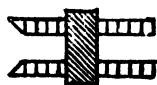
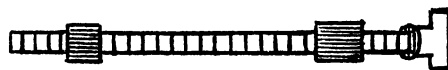
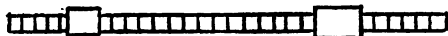
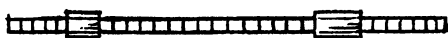
ANTHROPOMETRIC INSTRUMENTS



Martin's
Slide Callipers



Martin's
Slide Compass



Anthropometer

INSTRUMENTS USED IN ANTHROPOLOGY

CALLIPERS (Martin type)—The scale is straight, one end is fixed on one of the curved legs, and runs along a separate piece attached to the movable leg by pivots. The instrument is furnished with a binding screw on the said piece of the movable leg. When the legs are placed on the two points of measurement, the binding screw is turned to fix the legs in position and the distance of the legs is read along the scale. This instrument is required for taking length and breadth measurements of the head.

SLIDE COMPASS—In it the scale rod is straight and forms the handle upon which the movable leg slides to find out its distance from the fixed leg. On one side of the scale the legs have sharp points for measuring the skeleton, and on the other they are rounded and flattened horizontally for measuring the living. This instrument is used in measuring nasal length and breadth.

ANTHROPOMETER—It consists of a long rod of rigid steel of four different parts of 50 cms. each. Upon one side of this rod there is a graduated ascending scale from the bottom to the top where an immovable socket is attached. A similar socket is also intended to bear a cross rod. This socket slides freely up and down the rod and records the height from the ground of any point upon which the end of the cross rod rests. On the opposite side the rod has a descending scale. It is used for taking stature measurement.

FACTORS TO BE NOTED ABOUT AN INSTRUMENT
BEFORE COMMENCING MEASUREMENTS

1. Name of the instrument.
2. Note if the different parts are in proper order.
3. Note the graduations and find out the zero mark.
4. The instruments are to be handled properly.

RECORDING

1. Suitable record blanks to be procured.
2. Name, age, sex, occupation, locality, race etc. of the subject must be entered.
3. Recording to be done at once during process of measurements.
4. Name of the recorder and date must be subscribed.

SELECTION OF SUBJECTS—is made on the basis of sex, age, homogeneity, pathological conditions and environmental distinctions.

PATHOLOGICAL CONDITIONS—For purely anthropological purposes all individuals, who are affected by some pathological conditions which materially alter the measurements, are not included in the series. These conditions are—rickets, tuberculosis of bones and joints etc.

STUDY OF LANDMARKS

Measurements, in order to be strictly comparable must be taken in a strictly defined way and from or between the same anatomical points. These points whether on the living or the skeletal parts are known as *anthropometric landmarks*.

DEFINITION OF MEASURING POINTS OR LANDMARKS

Alare (al)—is the most projecting point on the lateral wings of the nose.

Asterion (ast)—A point behind the base of the mastoid process where the lambdoidal, parietal and occipital squamas sutures meet, i.e. the meeting point of the parietal, temporal and the occipital bones.

Auriculare (au)—is a point, placed vertically above the centre of the auditory meatus, crossing the root of the Zygoma.

Bregma (b)—The meeting point of the frontal with the parietal bones.

Basion (ba)—is a point, placed in the middle point of the anterior margin of the occipital foramen.

Coronale (co)—The two points are placed in the lateral margins of the frontal bone which record the termini of the greatest breadth of the bone.

Dacryon (d)—is a point, placed just within the inner margin of the orbit where the frontal bone meets the lachrymo-maxillary suture.

Euryon (eu)—The two points opposite to each other on the sides of the skull (parietal side) which form the termini of the widest breadth.

Frontomolare-Orbitale (fmo)—is a point placed at the orbital end of the frontomolare suture.

Frontomolare-temporale (fmt)—is a point, placed at the outer end of the frontomolare suture.

Glabella (g)—is the most prominent point, placed in the middle line between two eye-brow ridges.

Gnathion (gn)—is the lowest middle point on the

lower border of the lower jaw (mandible).

Gonion (go)—is the angle of the mandible between its body and the ramus.

Inion (i)—is a point where the superior nuchal line cuts the median plane.

Lambda (λ)—is a point where the occipital meets the two parietal bones.

Lachrymal (la)—is a point where the posterior lachrymal crest intersects the fronto-lachrymal suture.

Mastoidale (ms)—is the lowest point on the mastoid process.

Nasion (n)—is the junction of the frontal with the nasal bones (i.e. a point where the internasal suture meets the frontal bone).

Opisthion (o)—is a point, placed in the middle point of the occipital foramen.

Opisthocranium (op)—is the posterior end of the maximum length line of the skull drawn from the glabella.

Orale (ol)—is a point in the bony plate where the line drawn tangent to the curves in the alveolar margin, back of the two medial incisor teeth, crosses the median plane.

Orbitale (or)—is the lowest point in the lower margin of the orbit.

Prosthion (pr)—is the lowest point of the intermaxillary suture, placed upon the alveolar margin.

Porion (po)—is the upper most point in the margin of the auditory meatus.

Metopion (m)—is a median point of a line con-

necting the two frontal eminences.

Staphylion (sta)—is a point in the median line of the back of the hard palate where it crosses a line drawn tangent to the curves of the posterior margins of the palate.

Subnasale (sn) or *Nasospinale* (ns)—is a point of the angle between the septum of the nose and the surface of the upper lip.

Vertex (v)—is the highest point on the top of the head in the median sagittal line.

TECHNIQUE OF MEASUREMENTS

MAXIMUM HEAD LENGTH (g-op) i.e. the maximum glabella-occipital diameter of the head.

INSTRUMENT—Martin's slide callipers.

LANDMARKS—Anteriorly the most prominent point of the glabella, posteriorly opisthocranium.

METHOD—The experimenter applies the thumb and middle finger of his left hand in contact just below the glabella, places the fixed end of the left branch of the callipers on these fingers so that the point touches the glabella and applies the left fore-finger over the end. The right hand is now moved partly around the proximal part of the callipers so that the two branches rest on the fourth and middle fingers. The free end of the right branch is then applied over the middle line on the most prominent point of the occipital bone and is moved up and down until the maximum length is noted.

MAXIMUM HEAD BREADTH (eu-eu) i.e. the greatest transverse diameter in the horizontal plane of the head.

INSTRUMENT—Martin's slide callipers.

LANDMARKS—Determined solely by the maximum breadth of the head above the mastoid and Zygoma.

METHOD—The experimenter stands behind the subject holding the ends of the instrument in both his hands and searching for the points on the parietals which give the maximum diameter. Care should be taken that the ends are always kept in a horizontal plane and at right angles to the maximum head length.

CEPHALIC INDEX—expresses the breadth of the head in terms of percentage of the length of the head ($C.I. = B \times 100 \div L.$).

NASAL LENGTH (n-sn) i.e. the length of the nose from the nasal septum where this joins the upper lip to the nasion.

INSTRUMENT—Martin's slide compass.

METHOD—Apply left hand in such a way that the thumb is at a very short distance above the nasion. Place the fixed branch of the compass against the thumb and with this gently touch the nasion. Push the movable branch of the compass to the point where the septum joins the upper lip and take the reading.

NASAL BREADTH (al-al)—the maximum normal external breadth of the nasal bone determined without the exertion of any pressure. Care should be taken that the nostrils of the subject are not pushed in or out.

INSTRUMENT—Martin's Slide Compass.

NASAL INDEX—($N.I. = B \times 100 \div L.$).

HEIGHT VERTEX OR STATURE

INSTRUMENT—Anthropometer.

METHOD—The subject stands erect on a level surface with heels together, the buttocks and shoulder kept in vertical line, while the head is held so that the visual as well as the binocular axis are horizontal. The arms should be in natural position. The experimenter stands just in front of the subject and the square of the anthropometer is applied to the head horizontally two or three times and the reading is taken the instrument being placed just in front of the subject.

OBSERVATIONS

SKIN COLOUR—It is described by comparison with Von Luschan's standard scale. It is taken on an unexposed as well as on an exposed part of the body. For the former, the underside of the arm, or the chest is selected. The cheek is studied for the effects of light and wind in pigment. The scale is held against the part of the skin studied and the number of the closest match noted. Skin colour according to Hrdlicka is given below:—

White—light, medium, dusky, light-brown.

Yellow—pale, brownish, dusky.

Brown—light, medium, dark, chocolate.

Black—brown, bluish, greyish, ebony.

HAIR—its quantity, character, colour and texture are to be studied.

Quantity—Normal, medium or thick.

Character—Straight, wavy or woolly.

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Colour—White, grey or black (black, dark-brown, reddish-brown, light-brown, cloud-golden, red, grey).

Texture—Coarse, medium or fine.

FORM OF MEASUREMENTS

Name.....	Age.....	Sex.....
	Date.....	
Tribe.....	Clan.....	Subdivision....
Place of birth.....	Residence.....	
Occupation.....	Language.....	Religion.....
Father.....	Mother.....	

MEASUREMENTS

Head length	(g-op).....
Head breadth	(eu-eu).....
Nasal length	(n-ns).....
Nasal breadth	(al-al).....
Stature	.....

INDICES

Cephalic	.....
Nasal	.....

OBSERVATIONS

Skin Colour	.....
Hair Form	.....
Quantity	.....
Texture	.....
Colour	.....



